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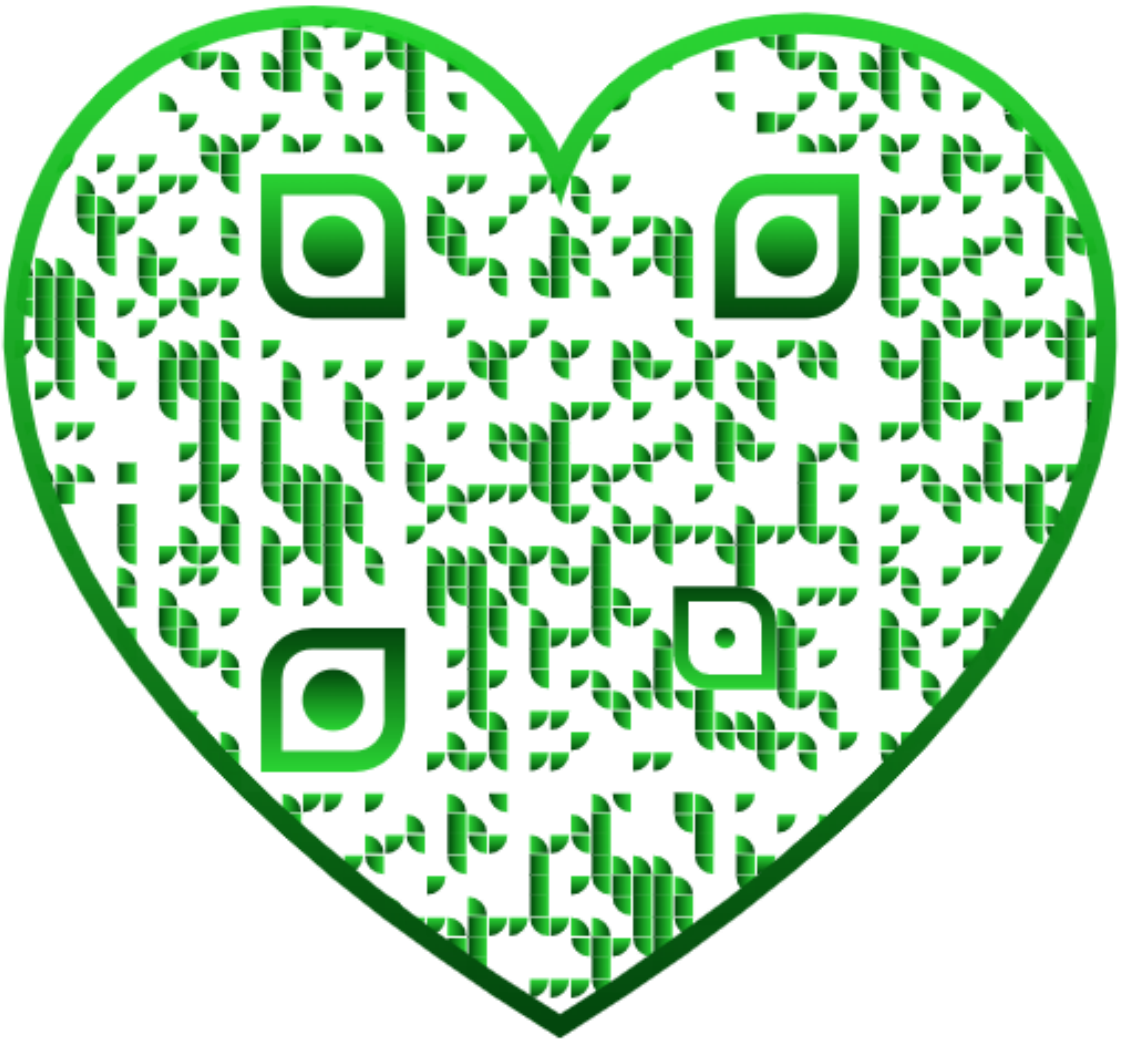

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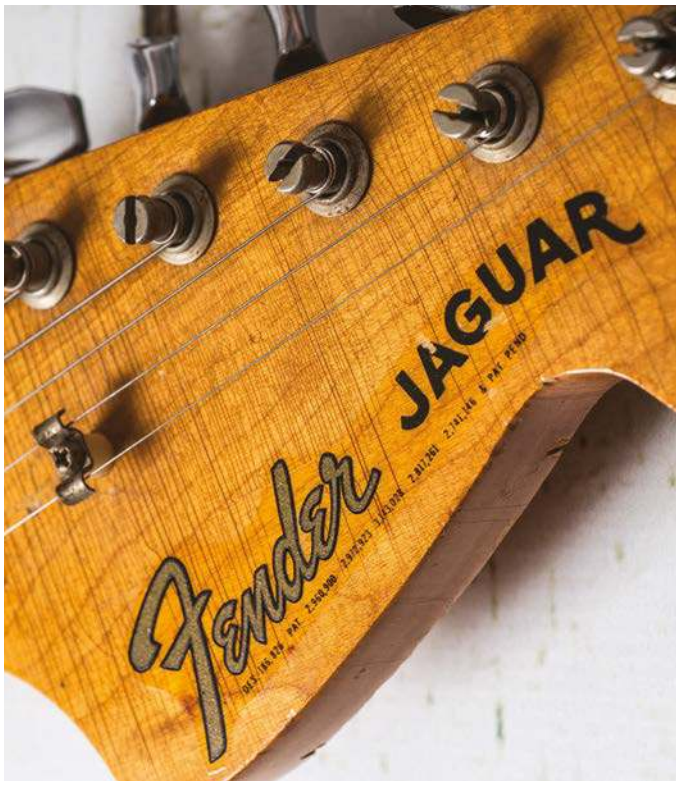
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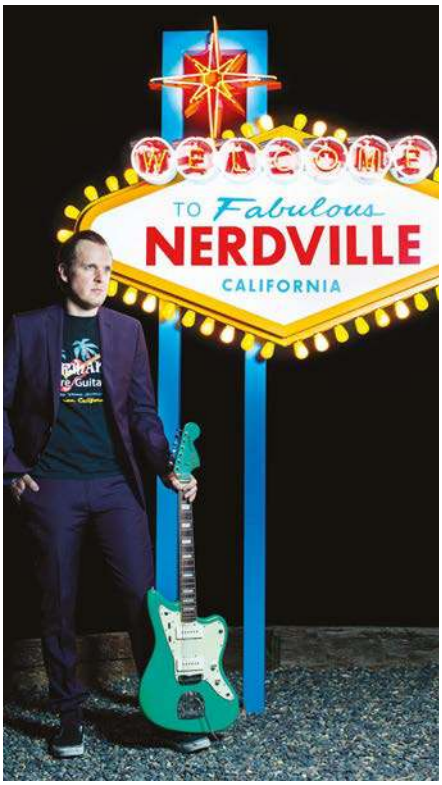
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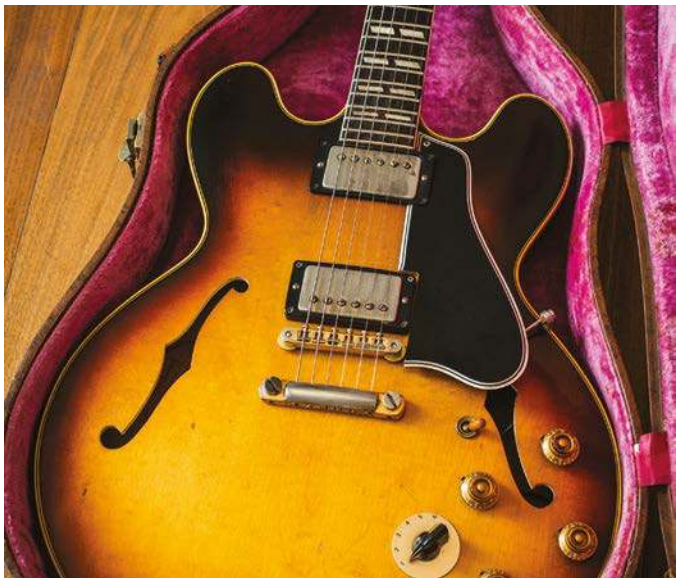

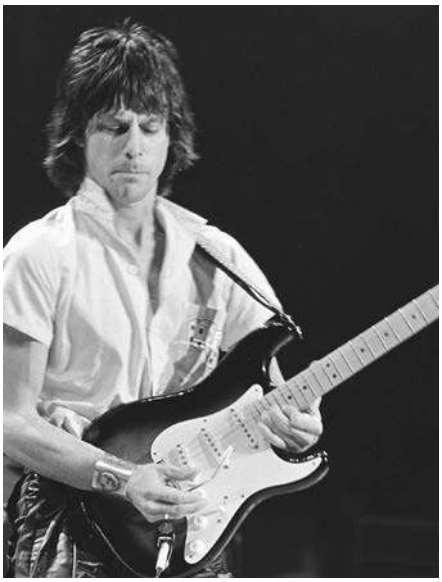

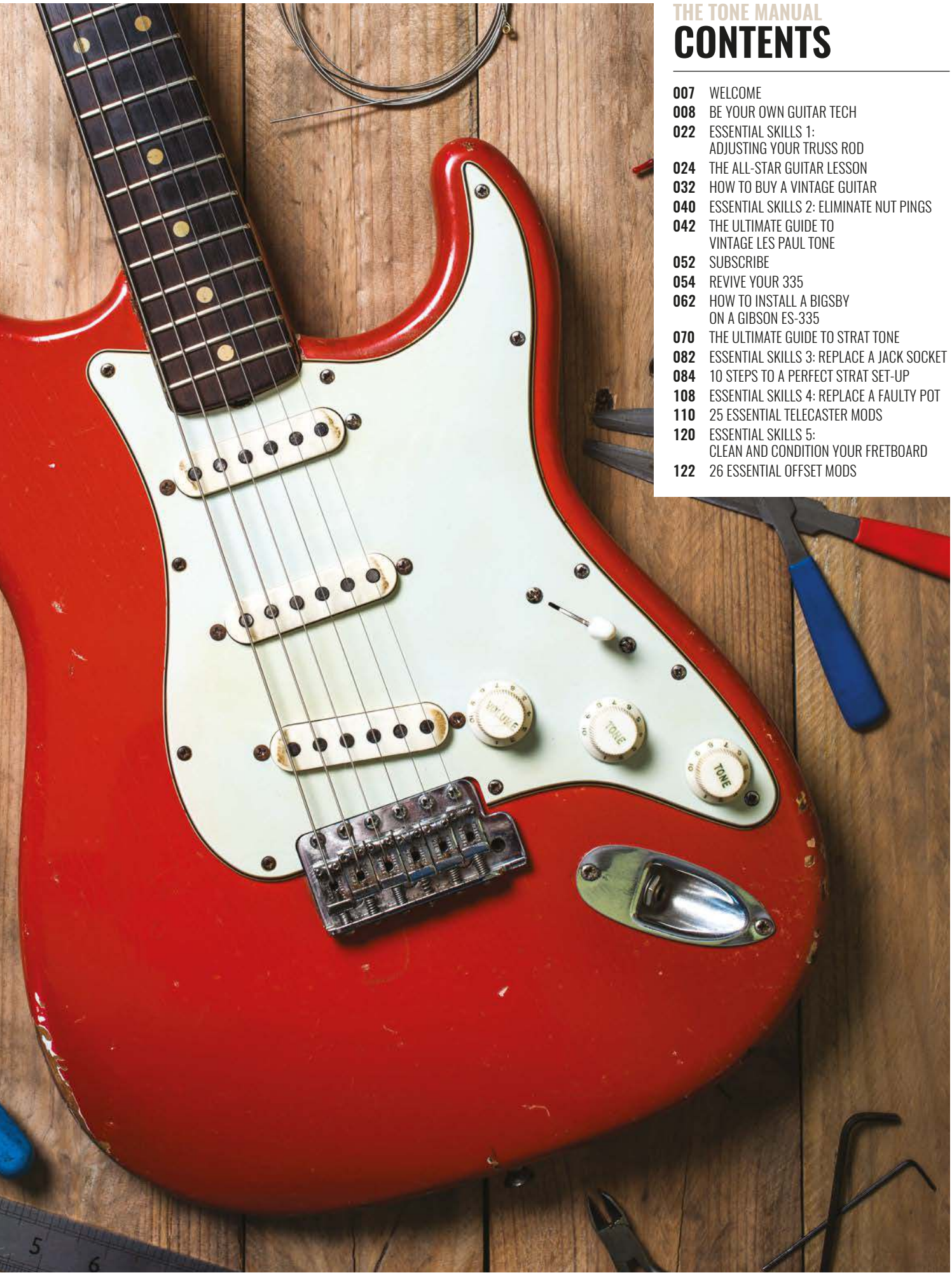

THE TONE MANUAL

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ART EDITOR Kerry Moyle
MANAGING EDITOR Josh Gardner
PRODUCTION EDITOR Owen Bailey
PUBLISHING PRODUCTION MANAGER Craig Broadbridge
ASSOCIATE EDITOR Sam Roberts
SENIOR PRODUCT SPECIALIST Huw Price
INSTRUMENT & COVER PHOTOGRAPHY Eleanor Jane
HAVE A STORY? Email us at editors@guitar.com

SALES

ADVERTISING MANAGER Joe Supple
joe.supple@guitar.com
BUSINESS DEVELOPMENT MANAGER Di Marsh
di.marsh@guitar.com

PRODUCTION & OPERATIONS

PRINT William Gibbons & Sons Ltd
DISTRIBUTED BY Marketforce (UK) Ltd
5 Churchill Place, Canary Wharf, London E14 5HU

BANDLAB TECHNOLOGIES

CHIEF EXECUTIVE OFFICER Meng Ru Kuok
CHIEF OPERATING OFFICER Ivan Chen
UK COUNTRY DIRECTOR & HEAD OF STRATEGY & PARTNERSHIPS (EMEA) Holly Bishop
AVP, WEB TECHNOLOGIES Laurent Le Graverend
AVP, COMMS & PARTNERSHIPS Lauren Hendry Parsons
SENIOR MANAGER, BRAND STRATEGY Krystle Hall
MANAGER, CONTENT STRATEGY Iliyas Ong
ASSOCIATE MANAGER, CONTENT STRATEGY Terence Stanley
STAFF WRITER Cillian Breathnach

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EDITOR'S LETTER

TECH SUPPORT

You've got your guitar. You've got your amp. You've got a handful of effects pedals. What's next? The path to killer tone is beset on all sides and often, the great guitar sound in your head is out of reach for financial reasons, rather than any lack of enthusiasm or playing ability. But wait! Help is at hand.

Across 132 info-packed pages, we present *The Tone Manual* – essential reading for guitar players looking to sound better today. A mixture of practical advice and pro tips, whether your road-worn favourite has lost its lustre or you're flummoxed by the mysteries of the Stratocaster vibrato system, *The Tone Manual* lifts the lid on how professional guitarists sound great, night after night.

And the good news is, it doesn't have to cost the earth. Armed with a screwdriver or Allen key, you can often save yourself an expensive trip to a luthier or avoid buying that costly new set of tuners or pickups. Think of the electric guitar as a system and you won't go far wrong – each part needs to be working in harmony to get the best sound and optimal playability from your instrument.

All the major six-string food groups are covered herein – Les Paul, Strat, Tele, semi, offset and acoustic – and we even include an expert guide to buying vintage, for those of you whose journey is leading inexorably towards a golden-era guitar.

If all that doesn't quench your thirst for guitar knowhow, there's plenty more to peruse on *Guitar.com* and in the pages of *Guitar Magazine*. No gear malady is too nerdy for the team to diagnose and we love seeing the results of your DIY projects, so please get in touch and let us know how you get on!

Chris Vinnicombe
Chief Editor, Guitar.com & Guitar Specials
chris@guitar.com

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BE YOUR OWN

GUITAR TECH

45 ESSENTIAL MAINTENANCE & TONE TIPS

Whether your number one is a sticker-covered, blood-splattered road warrior or a much-cherished heirloom, one thing's for sure: sooner or later, every guitar needs a little TLC. Before you pick up the phone and arrange an expensive trip to the luthier, this list of simple fixes, mods, upgrades and general maintenance tips might save you some money and help you sound better into the bargain…

WORDS HUW PRICE, CHRIS VINNICOMBE, JOSH GARDNER

DISCLAIMER We've split things up into the major food groups – Strats, Les Pauls, Teles, thinline semis, Gretsches and acoustics – but most of these tips apply to many other models and brands. If in doubt, we always recommend seeking out an experienced guitar tech and please proceed with extreme caution when it comes to vintage instruments – modifications can devalue your guitar in the eyes of collectors. All that said, if you can operate a screwdriver and a soldering iron and have the patience, there's often no reason why you can't have a go yourself. Write in and let us know how you get on!

VOLUME
TONE
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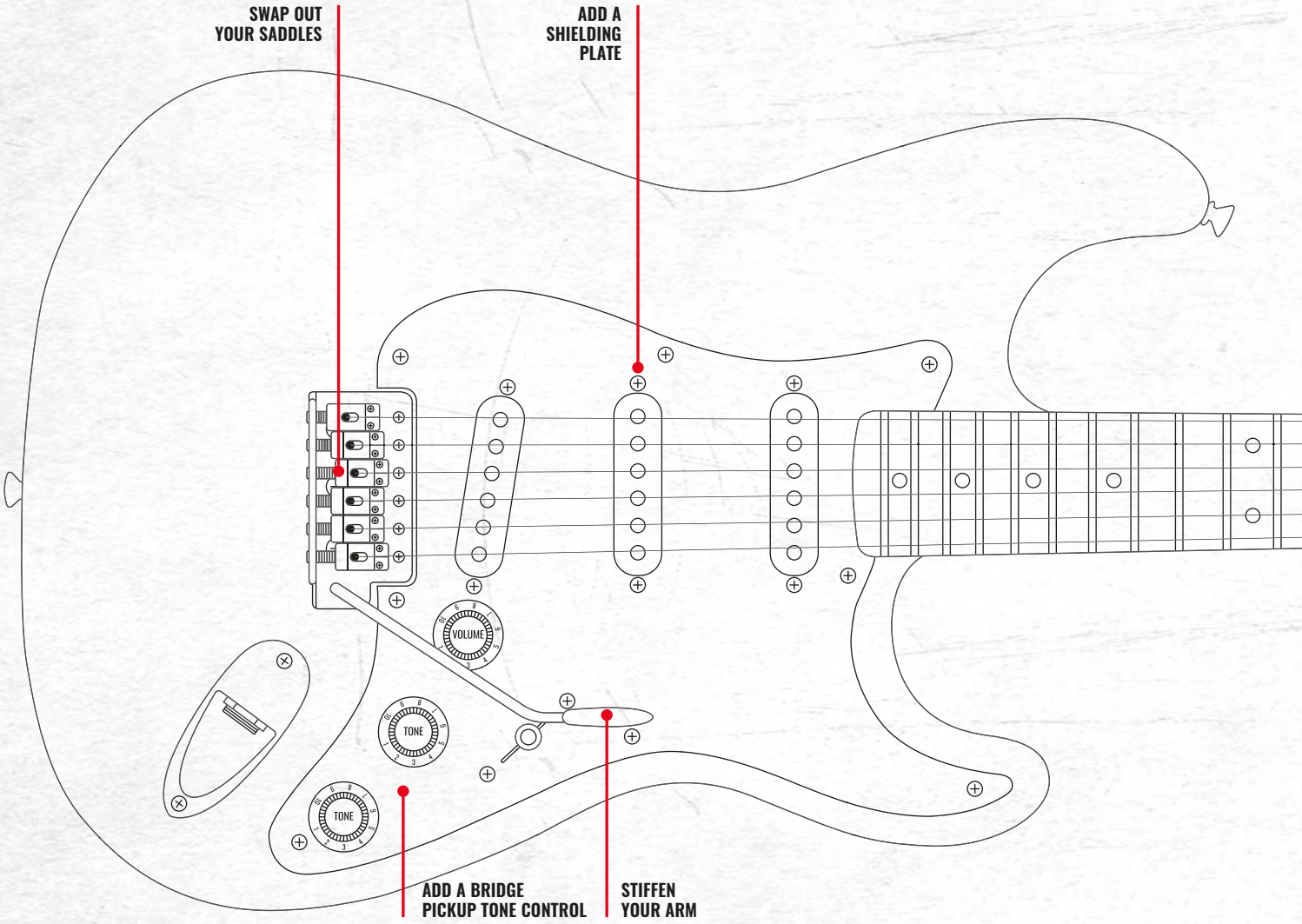
FRETBOARD
LEMON OIL

SORT OUT YOUR STRAT



1 TIGHTEN UP YOUR NECK

If a guitar's neck is loose in its pocket, it will be less effective at transferring vibrations. On top of that, the neck may actually move around, causing tuning instability and even string slippage. On occasion, you can see a gap between the bottom of the neck and the neck pocket, even when the screws are fully tightened. Assuming there's no shim, this could be because the screw holes in the body are too narrow for the screws. If you can't push the plate screws straight through the body holes, you should have them drilled out to increase their diameter.

2 BLOCK THE TREMOLO

Some Strat players never use the vibrato – Robert Cray and Billy Gibbons prefer hardtails – but most consider the springs to be an essential component of the Stratocaster sound. How can you have a vibrato-loaded Strat that can be tuned up in a single pass and won't go out of tune when you snap a string? Simple: tighten the spring claw, place a lump of wood between the bridge block and the back of the vibrato rout and slacken off the claw to allow string tension to wedge it in place. It's simple, it's cheap, and it works. Just ask Eric Clapton.

3 CLEAN UP YOUR NECK POCKET

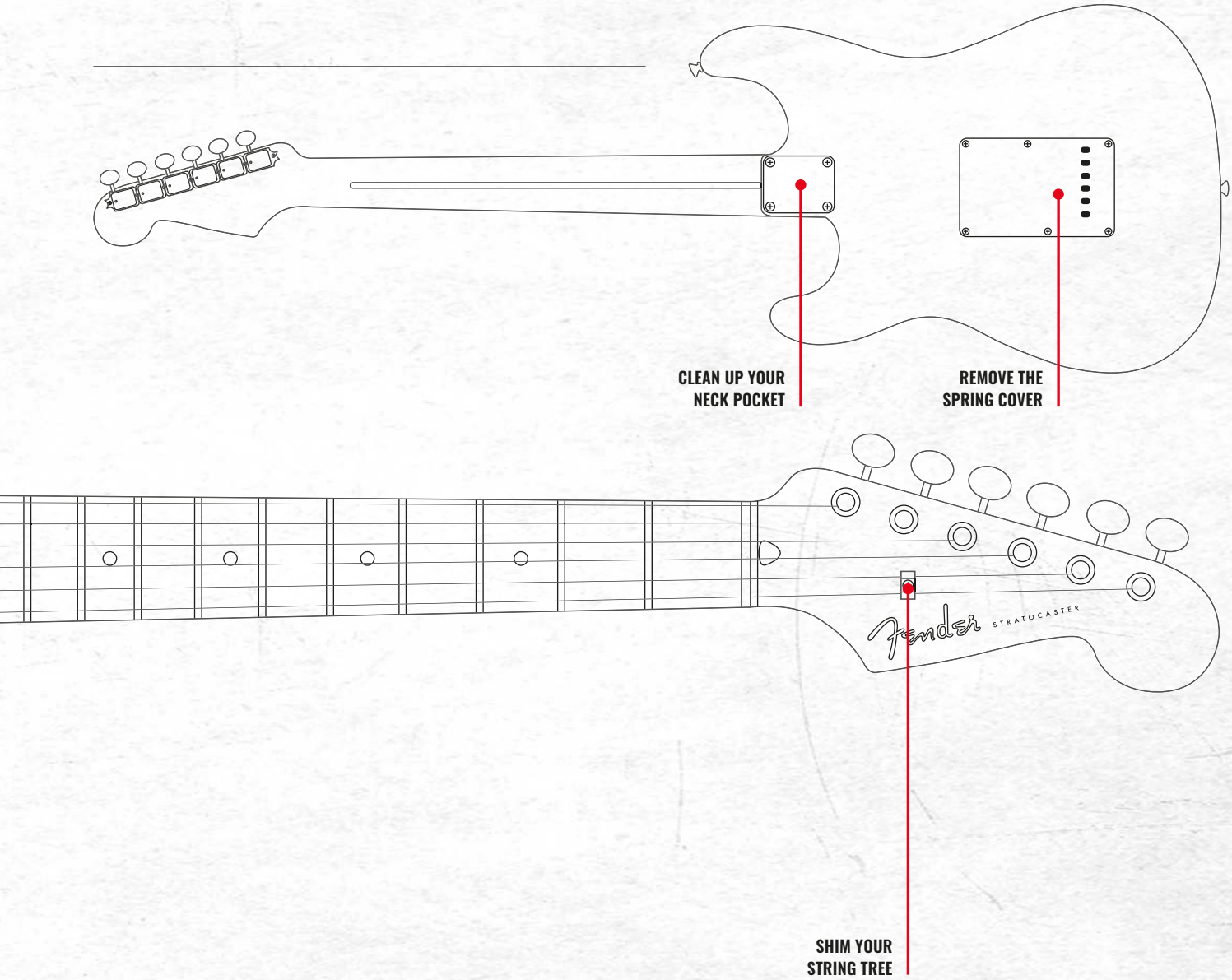
To resonate together as one, the body and neck of a guitar should be coupled as tightly as possible. Wood-to-wood contact is ideal – but this isn't the way things generally turn out. Pop the neck off and you can find various horrors in the pocket. A shim is often needed to achieve an optimal neck angle – and it's accepted practice – but rubber grommets, cardboard and scraps of sandpaper are not ideal. Try a sliver of hardwood veneer if you need to shim. Many necks have labels and stickers in between the screw holes. Peel them off and clean up any residual stickiness.

4 ADD A BRIDGE PICKUP TONE CONTROL

Many have wondered why Fender's original design chose to provide tone controls for the neck and middle pickups but neglected to provide treble roll-off for the pickup that actually needed it most. It's likely down to some combination of the darker tonality of early tweed amplifiers and the high-treble requirements of the Western swing players who were Leo's clients, but it's easy enough to remedy and if you can solder, it shouldn't cost a thing. Method one is to swap the middle (or neck) pickup's tone control to the bridge pickup; method two is to locate the wire that connects the second tone pot to the switch, then solder a short section of wire between that tag and the next tag along towards the middle of the switch. Problem solved.

5 SWAP OUT YOUR SADDLES

Most of the changes introduced during Fender's CBS era were intended to reduce costs. Like many other components, the quality of string saddles fell when a cheap alloy nicknamed 'monkey metal' replaced the bent steel. For vintage tone, steel saddles may provide a noticeable improvement;



other popular choices include stainless steel, graphite and titanium. They all have different tone and sustain characteristics, so do your research and make sure the saddles you choose are compatible with your Strat's string spacing.

6 ADD A SHIELDING PLATE

Between 1959 and 1967, Fender used an aluminium shielding plate beneath the Stratocaster's scratchplate. We can't offer a scientific explanation, but we once fitted one on a whim to an old Strat and marvelled at how it made the guitar's midrange acquire a thicker, chewier and sweeter vintage loveliness. If you're after that Stevie Ray Vaughan-style Strat sound, for the cost of a £10 shield, this is well worth trying.

7 SHIM YOUR STRING TREE

In lieu of an angled headstock, Fender uses string trees to achieve the necessary break angle over the nut. But we've seen plenty of Strats with string trees screwed flat to the front of the headstock, making the break angle greater than it needs to be and increasing friction under the tree itself. Put a spacer under the string tree to reduce the angle and straighten the string path between the nut and the tuners – it should improve your tuning stability.

8 TUNE YOUR TREM

Leo Fender and his team intended the Stratocaster vibrato to be a floating unit, where the spring tension balances out the pull from the strings. There are no hard and fast rules about setting these up, because all players require different feels. Some require no upward movement, but most prefer to be able to bend above and below pitch. Tightening and loosening the claw screws on either side fine-tunes the response and it can be done with surprising precision. Carl Verheyen tunes his trems so the third, second and first (G, B and E) strings pull up a minor third, a tone and a semitone respectively. It sounds very musical and it's surprisingly easy to set up – try it!

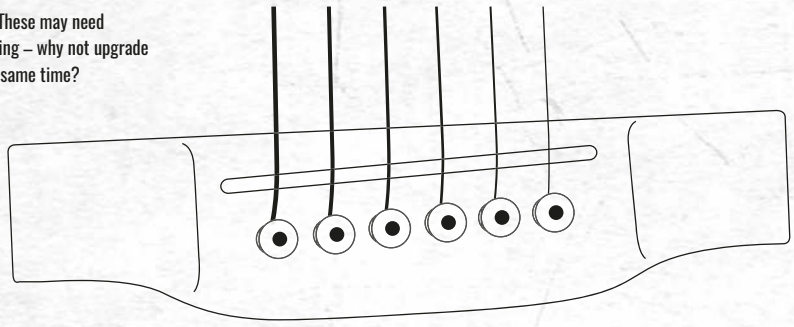
9 STIFFEN YOUR ARM

Over time, vibrato arms can become loose. They rattle back and forth when you use them, causing noise and making it harder to achieve a smooth action. There are a couple trusted remedies. Some players like to drop a small spring into the bottom of the arm hole so, as the arm is tightened, it presses against the spring and feels a bit more stable. Another popular fix is to wrap PTFE tape around the arm thread.

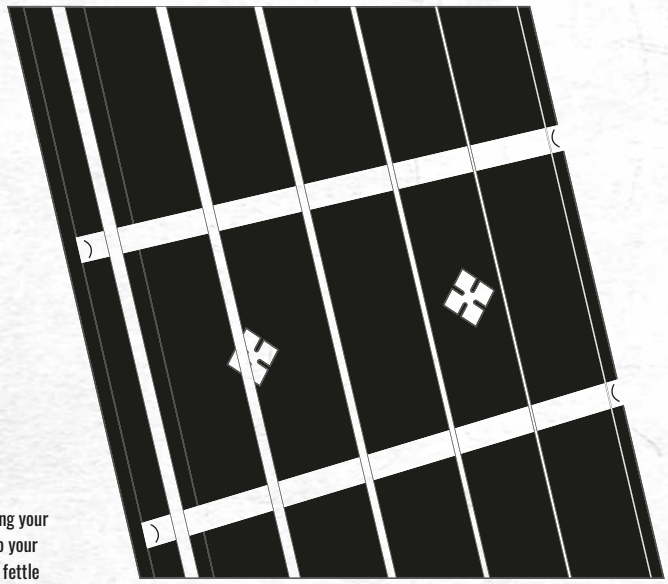
10 REMOVE THE SPRING COVER

Some players claim to hear the effect of a removed spring cover while others can't hear any change at all… and even the advocates admit it only works on some Strats. Either way, it's free and totally reversible. Unscrew the six screws holding the spring cavity cover onto the back of the body and remove it. If your guitar sounds more resonant and responsive, then congratulations on completing a successful upgrade. You'll probably find string changing a lot easier, too.

OVERHAUL YOUR ACOUSTIC



PINS These may need replacing – why not upgrade at the same time?



FRETBOARD Cleaning your fingerboard will keep your acoustic tone in fine fettle

1 EXPERIMENT WITH PINS

After hundreds of restringing cycles, bridge pins can show signs of wear. For optimum tone and stable tuning, it's essential that strings are firmly anchored at the ball end and if you're noticing pins creeping upwards when strings are tuned to full tension, it might be time to consider pin replacement. But be warned, because it might be that the string holes in the bridge are getting a bit worn, too, and new pins won't necessarily fix that.

When shopping for pins, you might consider an upgrade – especially if the originals are plastic. For instance, a set of ebony pins might smooth brash treble, bone pins may provide extra brightness and complexity, while brass may enhance body, sustain and harmonic overtones.

Vintage-style Martin pegs may not have string grooves cut into them, however the vast majority will, and the groove should be oriented towards the bridge for the string to sit in the channel. The pins should not necessarily sit flush with the top of the bridge and never try to force them all the way in if it's a tight fit, because you risk splitting the bridge. When replacing pins, measure the diameter of the originals to establish the size and taper you need and have fun with this cheap and easy modification.

2 CLEAN YOUR 'BOARD

Many modern acoustics come with Richlite fingerboards, a man-made material comprised of resin-infused paper. With its uniform jet-black appearance, it's a dead ringer for ebony and some believe it could eventually replace ebony in large-scale guitar production. Like wood, Richlite can get dirty, but it's easy to clean. Wipe it down with a soft damp cloth and avoiding the use of chemicals and fingerboard conditioners.

If your fingerboard is rosewood or ebony, it will benefit from being cleaned periodically. Finger grease, dead skin and goodness knows what else can build up and become impacted, which makes it harder to remove. Some prefer to start by scraping off the dirt using the edge of a credit card or even a Stanley blade scraper, but it's best to avoid the latter unless you are experienced and skilled.

Others eschew scraping and wipe the fingerboard down with naphtha (aka lighter fluid) squirted onto kitchen paper. It takes longer, but it will lift off the detritus without removing any wood. Some warn that naphtha can damage the finish and dry out the wood, but we've never experienced anything untoward with nitrocellulose finishes.

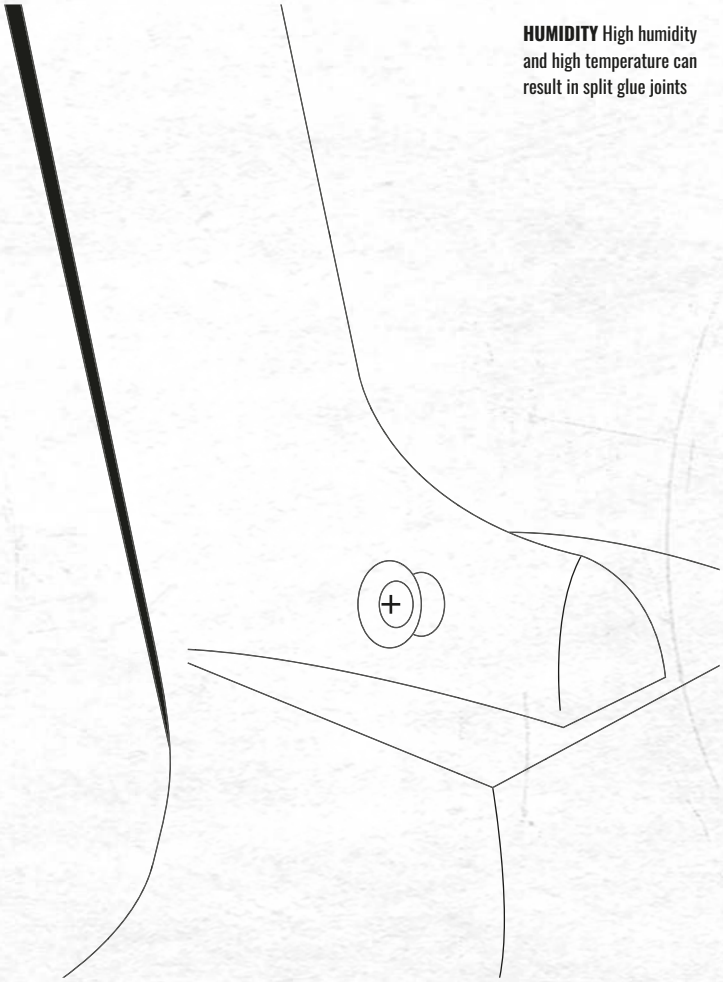
The gentlest way to get the detritus off is to use a specialist fingerboard cleaner such as Dunlop Fretboard 65 Ultimate Lemon Oil. You can also apply it after cleaning with naphtha to prevent the 'board from drying out. Simply wipe it on, allow it to sink into the wood for several minutes, then wipe off the excess and buff up the 'board with a clean cloth. Cleaning of this sort shouldn't be necessary at every string change and two or three times per year will probably suffice.

3 TRY DIFFERENT STRINGS

Don't allow yourself to get hung up on using the same type of strings on every acoustic. With such a range of tonewoods, body sizes and bracing styles, it would be tantamount to using just one type of pickup on every electric guitar, irrespective of body style, shape or size. There are plenty of gauges, alloys and coatings to consider, so have fun discovering what works for you and your guitar.

However, it's key to understand that the strings must be suitable for the guitar. With electrics, you can use any gauge (within reason) and the only compromises will be tone and playability. With acoustic guitars, there are structural considerations that should guide your choice.

For instance, vintage-style Martins with scalloped bracing are not designed to withstand the tension of extremely heavy strings and even 0.012-gauge sets could be pushing it. You may observe the area behind the bridge bulging upwards, which is sometimes referred to as a 'belly'. Some bellying is normal and indeed preferable; however, bellying as a result of excessive string pull will raise the bridge and twist it forwards. String action will increase as a consequence and it may permanently distort the geometry of the guitar if you persist with heavy-gauge strings.



HUMIDITY High humidity and high temperature can result in split glue joints

Conversely, the more robustly constructed acoustics with non-scalloped bracing may lack volume and projection if a string set is too light. Sometimes, a heavier set will drive the top harder and help to bring out a guitar's voice. Also remember scale length – the OM scale is longer than the 000 scale, for example – so you and your guitar may be fine going up a gauge with a shorter scale length.

4 THINK ABOUT HUMIDITY

All wood has moisture content and it shrinks and expands as it dries out and rehydrates. When guitars get very dry, the shrinkage can be sufficient to crack the wood. Clearly, it's desirable to avoid cracks so care must be taken with solid wood guitars to prevent them from drying out.

If possible, maintain your guitar's humidity level between 45 and 55 percent within a temperature range of 22-25 degrees Celsius. Rapid temperature changes are bad news, so if you fly with your guitar or bring it indoors after it has been in a freezing van all night, allow it to come up to room temperature slowly before opening the case.

Too much humidity increases the wood's moisture content, which causes it to expand. Over-hydrated wood may not sound its best but in isolation, a high moisture content shouldn't be an issue. When very high humidity is combined with high temperature, glue joints can become weakened and even open slightly.

Much of this is common sense and few would consider it wise to keep an acoustic guitar next to a radiator, an electric heater, an open fire or wood-burning stove – that's just cruel. Rapid humidity changes are as undesirable as temperature extremes because the rate of moisture loss will not be consistent, which increases the danger of cracks opening and joints failing.

Fortunately, specialist guitar humidifiers are readily available and very affordable. Martin and Taylor both market their own and they're all designed for the same purpose – you simply need to follow the instructions. If you do need to re-humidify an instrument, it might be best to do so with the guitar sealed in its case.

5 KEEP YOUR FINISH CLEAN

Although the factory-aged look has now made inroads into the world of acoustics, there's nothing nice about picking up an acoustic covered in gunk. Acoustic-guitar cleaning should begin by removing dust or potentially abrasive particles from the finish using a brush or a soft dry cloth. Once everything has been removed, you can think about polishing or cleaning the finish. In a sense, the two are different, so let's make the distinction.

Some finishes are porous and over time, grease and dirt can get into the finish to make it look dull or cloudy. In more extreme cases, this type of ingress on the back of the neck can create a tacky feel that seems to get worse after you've been playing for a while. Any cleaning process should focus on removing this to restore the look and feel of the guitar.

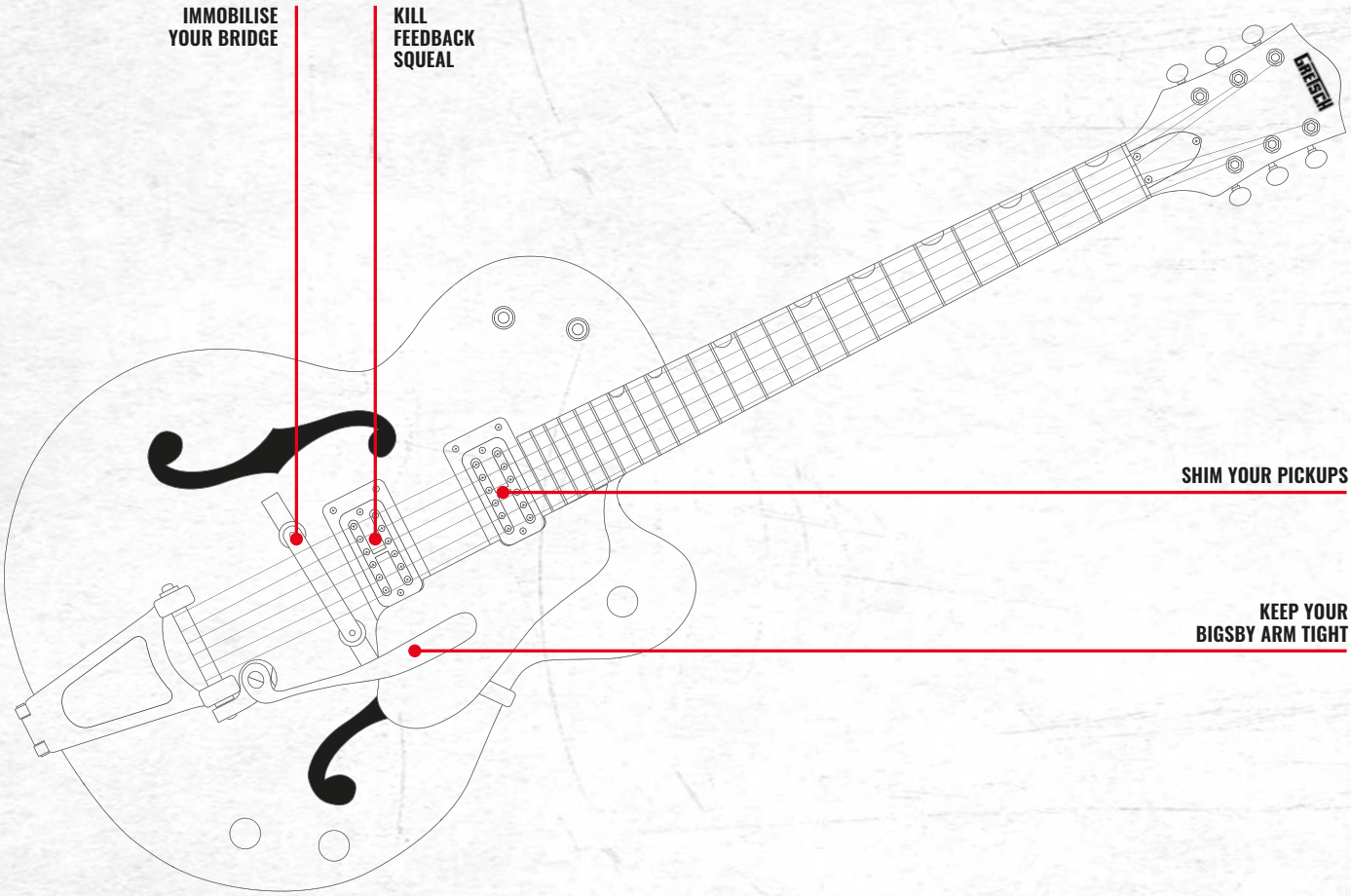
Sometimes, the dirt will simply be confined to the outer surface of the finish, so polishing the finish might be deemed sufficient rather than a deep clean. However, beware of matt and satin finishes – because polishing them can result in a blotchy and uneven sheen. With finishes of this sort, polishing should be avoided.

Before cleaning or polishing your guitar, it's worth finding out what type of finish it has because certain cleaning products may harm it. As a general rule of thumb, all abrasives should be avoided, irrespective of the type of finish.

If your guitar has a shiny and thick gloss coating of polyurethane, polyester or epoxy, it will probably outlast the guitar. Since it's pretty much impervious, you can buff it up with any old spray polish you might find in the cupboard and a soft cotton cloth.

For guitars with nitrocellulose finishes, more care needs to be taken because it's porous. Some cleaning products can impregnate the finish and stay there after you have buffed off the excess. Although they're more expensive, specialist guitar polishes and cleaners are probably your safest bet. Another generally accepted recommendation is to avoid cleaning products that contain silicone. We've had success with Virtuoso Premium Cleaner and Premium Polish in the past (virtuosopolish.com).

GET YOUR GRETSCH IN GEAR



1 IMMOBILISE YOUR BRIDGE

Although many new models come with this problem solved at the factory, when there isn't enough downward pressure on a traditional Gretsch bridge, it's all too easy for it to be knocked out of position. This is a well-known issue with archtop guitars in general – although heavier gauge strings might help, you would be compromising playability to fix a mechanical issue.

Fortunately, there are various solutions of varying degrees of invasiveness. Start by ensuring the guitar is set-up exactly the way you like it and the intonation is as accurate as possible. Carefully mark the position of the bridge by placing masking tape around the base. Now you have a few options.

Get some double-sided sticky tape. Rather than soft fabric-style carpet tape, go for double-sided Sellotape that's as thin as possible and will have minimal effect on vibration transfer. Apply the tape to the areas of the base that make contact with the body and trim the excess from the edges.

Line the bridge up carefully using your masking-tape markers and press the base down onto the body. You may need to renew the tape periodically, but many find this solution lasts for years. Some suggest that violin rosin and white glue work too, without damaging the finish. The alternative may be a luthier job, because it involves drilling through the bridge into the top of the guitar. Pins or small screws can then be used to fix the bridge and most choose to countersink them to make the modification as invisible as possible.

2 SHIM YOUR PICKUPS

You can achieve massive improvements in bass and treble balance, as well as overall tone, if you get the distances between the polepieces and strings just right. Unfortunately, vintage Gretsch pickups had no provision for height adjustment and many players have simply put up with things rather than explore the options.

Gretsch pickup guru TV Jones has been banging on about this for years and there's a page on his website dedicated to pickup adjustments. His recommended starting point is a 3/16-inch gap between the polepieces and the two E strings.

Since Filter'Trons and HiLo'Trons are screwed directly onto the body, you have to put springy foam spacers under the pickups to push upwards. Some people use mouse-mat material. DeArmond-style pickups require specially cut spacers, but they're easy to find online.

Set your polepieces as low as possible, adjust the overall pickup height, then fine-tune the polepieces if you feel the need. If you find your bridge Dynasonic too bright, spin it around 180 degrees to put the polepieces further from the bridge before you set the height.

3 SEAT YOUR ARCHTOP BRIDGE PROPERLY

You may have it pinned or taped, but for a traditional archtop-style bridge to transfer string vibrations into the body with the greatest efficiency, the base must be matched as closely as possible to the arch of the top.

Take a thin piece of paper and see if you can slip it under your bridge base. If you can find a gap anywhere, there's room for improvement, but fortunately, it's an easy fix. Cut out a rectangle of 320-grit abrasive paper that's about 5cm wide and about 3cm longer than the bridge base, then fix it to the top using masking tape.

The abrasive paper should be in the exact position of the bridge. Place the bridge base on top of the paper and move it back and forth very slightly following the direction of the strings. After a few movements, flip the bridge base over and you should be able to see areas of sanded and unsanded wood.

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GET YOUR GRETSCH IN GEAR continued

Continue a few strokes at a time, checking constantly, until all the wood shows evidence of contact with the abrasive. At that point, you're done. Remove the paper, refit the bridge and string up. The gaps should be gone and you will probably hear an improvement in acoustic tone. If you're happy with your bridge fit, mark the treble and bass sides with a pencil so the bridge will always be the right way around.

4 KEEP YOUR BIGSBY ARM TIGHT

Many of us will have suffered the problem of our Bigsby arms working loose or eventually falling off. Once you've slackened off the strings, reattached the arm and strung back up a few times, you'll probably be ready for a more permanent solution. The problem seems to be that moving the arm gradually loosens the retaining nut holding the arm onto the Bigsby assembly. Some swear by Nyloc nuts, but as always, opinions differ.

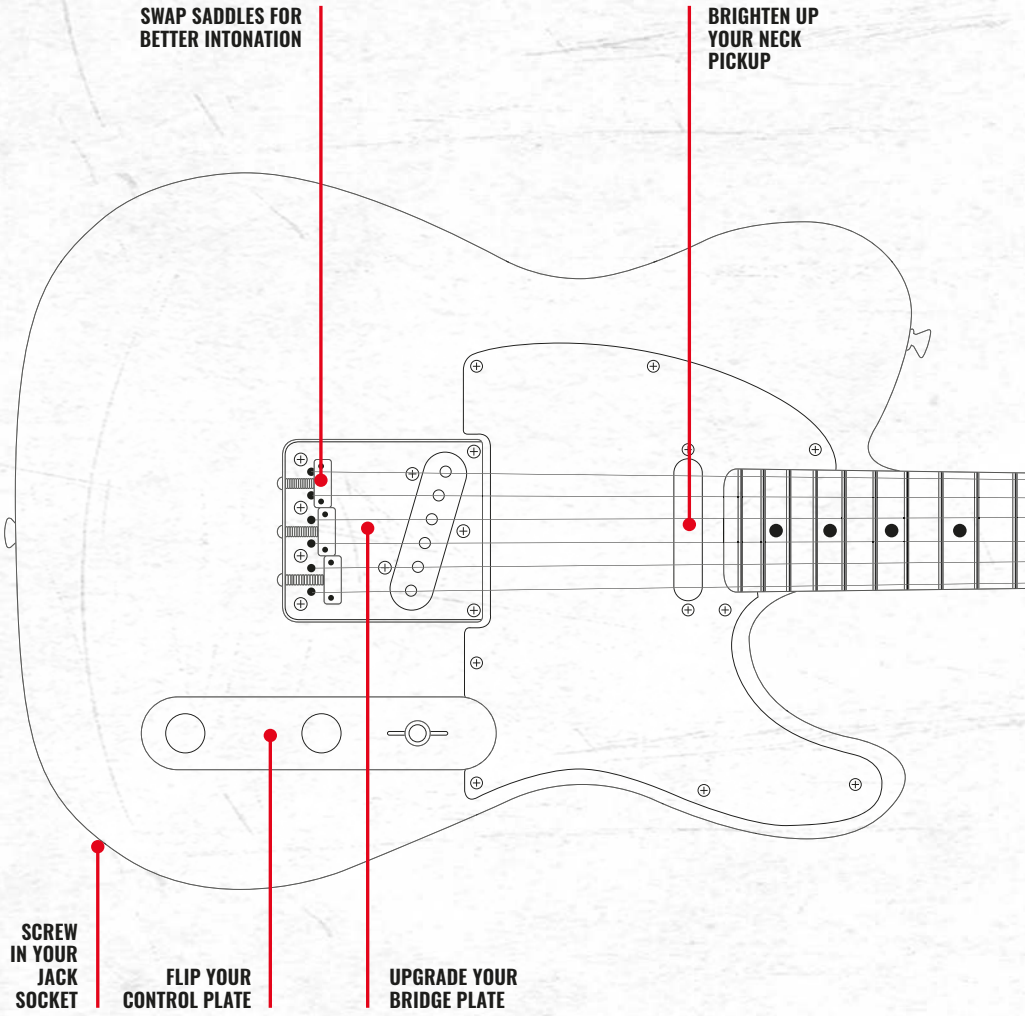
You may also find two thin nuts separated by a washer. That certainly applied to a '63 Tennessean owned by a member of the team – and the arm would fall off about once a week. Famed UK guitar tech Brinsley Schwarz fixed it by tightening the nut and locking everything together with Super Glue, and it's still holding over 20 years later.

5 KILL DEARMOND SQUEAL

DeArmond Dynasonics are often described as being like 'big-sounding Tele pickups' and just like Telecaster pickups, they have a tendency to squeal. Played clean at low-to-medium volume levels, Dynasonics can be very well behaved, but high volume and high gain can push them into microphonic feedback.

Underneath the bobbin, you'll find a complicated arrangement of screws, springs and retainers. Nothing is firmly fixed and soundwaves can certainly get everything moving all too easily. The key to killing the squeal is to stabilise the parts. You can get good results simply by wrapping strong elastic bands around the metal parts to bind everything tightly together. If you're suffering, the elastic-band trick is cheap and most certainly worth trying.

TROUBLESHOOT YOUR TELE



1 FLIP YOUR CONTROL PLATE

Almost from the beginning, players found the Tele's pickup switch too easy to knock accidentally, and spinning the control plate around was one of the first common mods that players figured out. It puts the volume and tone controls within easy reach and moves the selector switch safely out of the way. If you try this, remember to swap over the volume and tone potentiometers and flip the switch around, otherwise everything will work backwards!

2 SILENCE THAT SQUEAL

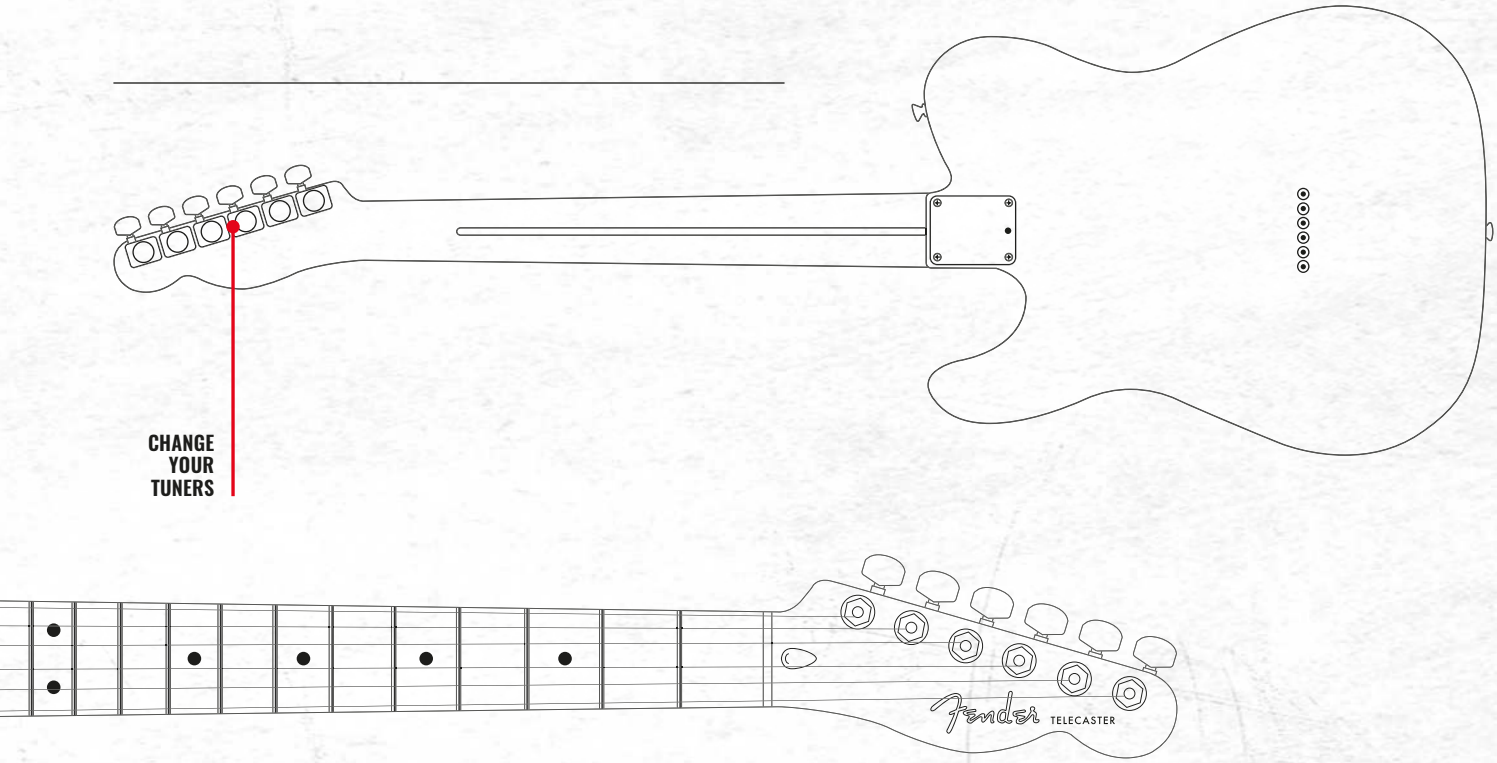
Microphonic feedback from Telecaster bridge pickups is commonplace, but is still no-less annoying for it. There are two simple ways to combat this: firstly, try swapping the spacer springs for 50s-style surgical tubing. You can also place some foam in the bottom of the pickup cavity; it has to be thick enough to press against the baseplate and dampen vibration, but not so thick that it prevents the height-adjustment screws from performing their function.

3 UPGRADE YOUR BRIDGE PLATE

For many years, players have complained that the sides of Fender's 'ashtray' bridge hinders access to the strings and takes the skin off their knuckles. If that's you, why not try a design with lowered sides from the likes of Gotoh or Callaham? There are also debates surrounding the tonal merits of bridges made of cold-rolled steel, brass and aluminium, while some also claim that squeal can be reduced if the base of the bridge is perfectly flat and smooth. Try a few and see which you prefer.

4 BRIGHTEN UP YOUR NECK PICKUP

Just like a traditional humbucker, the metal cover on a Telecaster neck pickup can suck a little treble from your tone. To unleash the full frequency potential of Tele neck pickups, just snip the cover's grounding connection. The downside is that you'll experience a bit of noise if you touch the cover, but that's easy to avoid and the extra brightness and transparency might persuade you to reconsider a pickup upgrade… or try a nickel-silver cover for less high-end attenuation than brass.



5 TRY TOP-LOADING

For a brief period in the late 1950s, Fender ceased through-body stringing on Telecasters and installed bridges with six holes drilled through the back lip. Many players feel that Teles with these 'toploader' bridges have a different sound. Detractors claim that top-loading reduces sustain, but fans point to enhanced twang, more bite and a ringing chime. Top-loading is also said to provide a more slinky feel – much like dropping down half a string gauge. If you want to try it yourself, either buy a top-loading bridge, or simply drill six holes in your existing unit.

6 SCREW IN YOUR JACK SOCKET

Traditional Tele jack sockets are held in place by a retainer clip that is notoriously fiddly to tighten up properly. Much more straightforward is a screw-in cup, such as those made by Electrosocket (allparts.uk.com). It pushes straight into the hole, two small screws go in on the diagonal to hold it in position and that's about it. The cup will never get loose, but you can take it in and out at will. Highly recommended.

7 STRAT-STYLE NECK PICKUP ADJUSTMENT

Traditionally, you have to remove the pickguard to adjust a Tele neck pickup as it's mounted to the body. To make adjustment less hassle, you can mount it to the pickguard like a Strat. Fix pieces of masking tape at each end of the pickup hole, flip the pickup over and drop it through the hole in the pickguard. With a sharp pencil or pen, you can mark the position of the pickup's screw holes onto the masking tape and drill through with an appropriate-sized bit. Remember, you'll need new screws that will bite into the pickup's bottom-flat, but you should be able to reuse the spring or tube spacers.

8 CHANGE YOUR SADDLES TO SOUND BETTER

Fender experimented with the materials of Tele saddles almost from the start and the different metals will give different tonal outcomes. Brass is regarded as having a smoother, richer tone, but steel has a brighter, snappier attack with more growl. Aluminium is said to give the bright 'acoustic' quality of steel without sacrificing the thickness and body of brass. There's no right answer – it's about what works best with your guitar and amp's particular sonic characteristics.

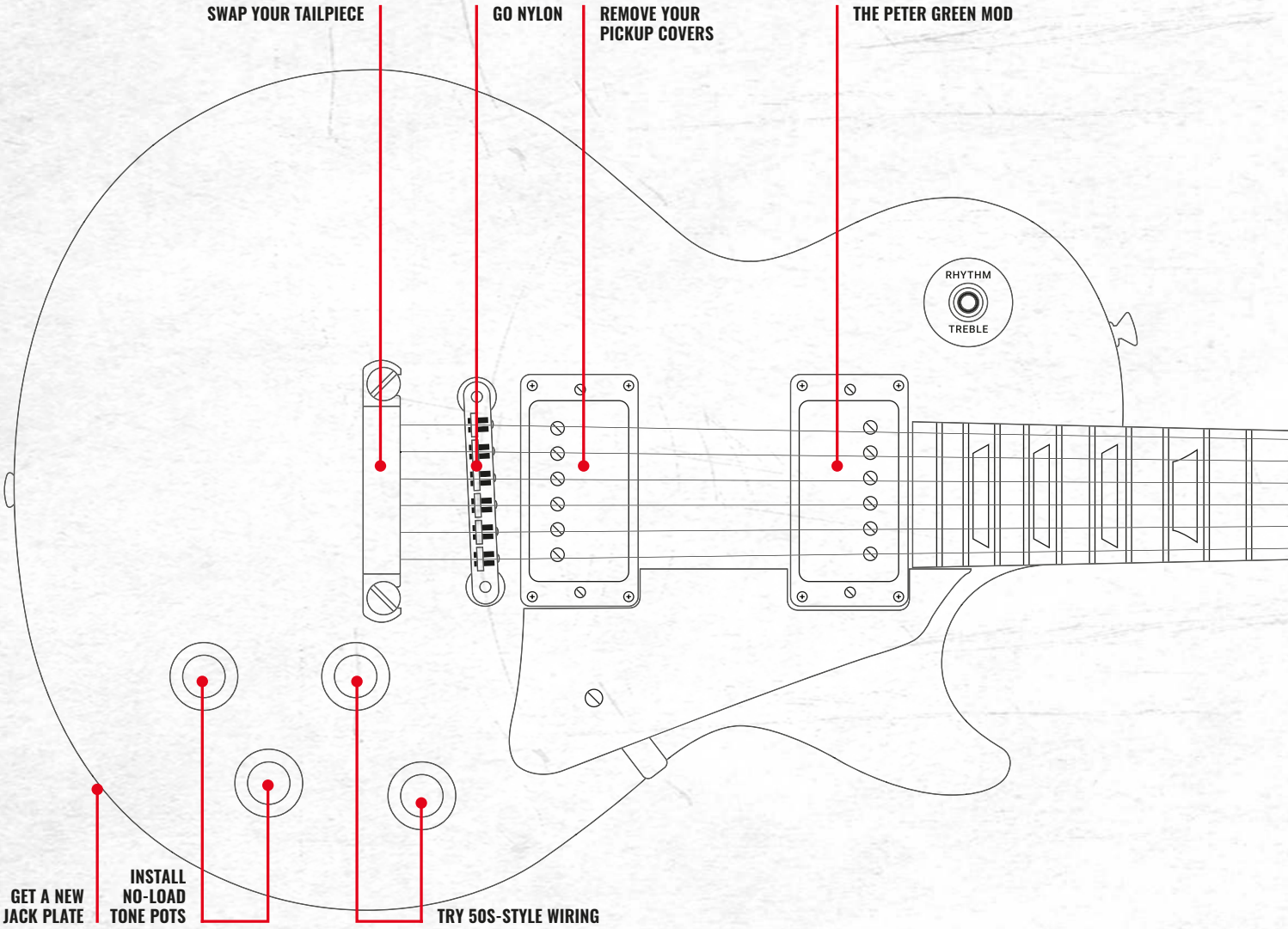
9 CHANGE YOUR TUNERS

Diecast tuners can make a light-bodied Tele a bit neck-heavy, so swapping them out for a set of vintage-style Kluson lookalikes can improve the cosmetics and feel. Alternatively, if you're doing a lot of behind the nut string-bending tricks, you may want to consider modernising with some diecast staggered-post tuners. These will enable you to ditch string trees and thereby reduce friction, making bending easier.

10 SWAP SADDLES FOR BETTER INTONATION

The presence of six individual saddles on the Stratocaster hints that Leo Fender understood that the three-saddle design has its limitations in terms of intonation. While six-saddle Teles are common these days, many prefer the tone of the old brass- and steel-barrel saddles, so to keep things intonated properly, get some compensated units. We're big fans of the Gotoh In-Tunes in solid brass (g-gotoh.com).

LOVE YOUR LES PAUL



1 REMOVE YOUR PICKUP COVERS

This is one of the earliest modifications players performed on their humbucker-equipped Gibsons. It was generally thought at the time that removing the covers made the pickups sound louder. In fact, players who removed their covers were probably just hearing a little more treble, because the capacitive effect of the covers caused high-frequency roll-off. Loose covers can also be a cause of microphonic feedback. Vintage nickel-silver covers were very thin and kept treble loss to a minimum, but later covers – especially thick brass ones – did the upper frequency response no favours.

2 GET A NEW JACK PLATE

Every guitar design has its weak spots and the jack plate is the Les Paul's – because the slim plastic plate is all too easy to snap. The solution to this dilemma is simple, however: fit a metal replacement. This is a cheap and reversible modification, but try to ensure the screw holes of the new plate will line up with the old one. If you want to keep the original look, simply install the plastic plate on top of the metal one.

3 THE PETER GREEN MOD

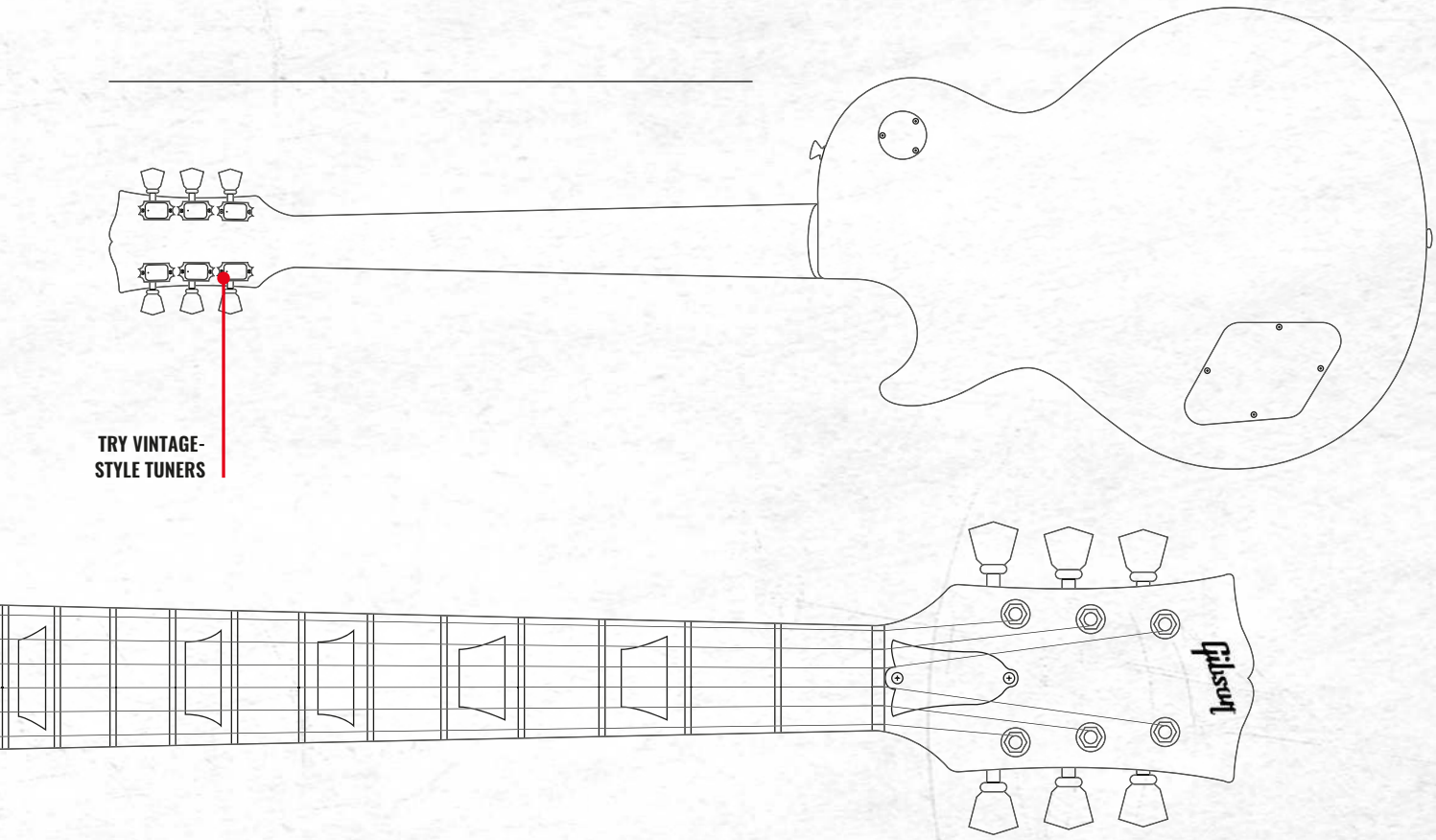
During his time with Fleetwood Mac, Peter Green's Les Paul had a very distinctive sound in the middle position. There are two ways you can replicate this. After removing the cover of one pickup (we'd suggest the neck), slacken off the baseplate, slide out the magnet then flip it around (not over) to reverse the magnetic polarity relative to the coil. Tighten the baseplate up, refit your cover if you use one, and you're done. Alternatively, you can flip the phase electronically by reversing the hot and cold connections.

4 BECOME A TOP WRAPPER

In addition to providing an anchor point for the strings, the stop tailpiece ensures that the strings have a suitable break-angle over the saddles. However, when the tailpiece is screwed tight to the body, the angle might be too sharp, increasing the chances of string breakage. One solution is to feed the strings through the tailpiece from the pickup side and wrap them over the top of the tailpiece. Proponents – among them Joe Bonamassa – claim that you get the tonal benefits of tailpiece-to-body contact coupled with more sustain and a slinkier playing feel, akin to swapping a set of 11s for a set of 10.5s.

5 TRY 50S-STYLE WIRING

If you own a soldering iron, this is one of the simplest and cheapest mods around. They call it '50s wiring' because it's the way Gibson hooked things up until around 1962 and the only actual difference was that the company connected the tone control to the output (middle) tag of the volume control rather than the input (outer) tag. This means you can turn down your volume control without the sound muddying up quite so much, and the volume and tone controls also become more interactive.



6 SWAP YOUR TAILPIECE

In the 1950s, Gibson's stop tailpiece was originally made from aluminium. Later on, this changed to zinc, which remains stock on many current models. Some players claim aluminium gives extra woodiness and more treble with a wider dynamic range, while zinc fans argue that their preferred metal has more low end and sustain. You can get a lightweight aluminium one for around £30, so do the Pepsi Challenge.

7 INSTALL NO-LOAD TONE POTS

A lack of clarity and treble is a common Les Paul complaint, but if you don't want to change your pickups, you can still get some of that treble back when you need it. With any tone control, there's always some treble bleed through the tone circuit – you can test this and see for yourself by disconnecting the tone circuit from the volume control. So try a 'no load' tone pot, which will enable you to eliminate the pot from circuit at the twist of a knob, and thus eliminate treble bleed? You can buy them or even make your own, and you'll notice the biggest difference in the neck position.

8 LOCK DOWN YOUR TAILPIECE

Traditional tailpiece studs do not grip stop tailpieces at all – the only thing holding the tailpiece in position is the pull of the strings. Often, you'll see tailpieces tilting forward, and it's claimed that better tone can be achieved by fixing the tailpiece more securely. TonePros (tonepros.com) and Faber (faberguitars.com) both offer retrofit means of getting your studs to grip.

9 GO NYLON

1950s Les Pauls sported nylon nuts. While a vintage-accurate 6/6-grade nylon nut is expensive, you could always try it at the other end. To minimise rattle and vibrations, Gibson was using nylon saddles on several models by the mid 1960s. These days, you can easily try swapping out your saddles – it's an affordable and reversible mod. Reducing friction is always a good idea if your Les Paul has a Bigsby, while nylon saddles also have a softer attack and sweeter high end than brass or steel. Some players – Mr Bonamassa included – have been known to try a half rice/half chips approach with metal saddles for the wound strings and nylon for the plain strings. Experiment!

10 GIVE US A KLUSON

Most original Bursts associated with big-name players have diecast tuners – with the exception of Billy Gibbons' Pearly Gates. Taking a Black & Decker to the headstock of a vintage LP may seem horrific nowadays, but diecast tuners require wider holes than Klusons and players were more concerned with keeping their guitars in tune than originality. Increased mass at the headstock may have enhanced sustain, too. Nowadays, players are equally likely to retrofit vintage-style tuners, but you'll need conversion bushes to do it. You'll get vintage looks and livelier dynamics – and, contrary to vintage lore, decent Kluson-style tuners hold their tuning just as well as diecasts.

REFINE YOUR THINLINE

1 KILL FEEDBACK – CHANGE YOUR SPEAKER

With more and more venues insisting on whisper-quiet stage levels, it makes low-wattage amplifiers and feedback-prone guitars with unpotted pickups more viable for gigging than they've been in decades. When stacks were king, even centre-block-equipped guitars such as the ES-335 could be problematic.

F-holes stuffed with rags or foam are probably less necessary these days, but something that's relatively unexplored is how the resonance frequency of individual speakers can impact on the onset of feedback. While auditioning speakers for a bespoke amp build, we noticed that two ostensibly similar alnico-magnet, 12-inch drivers – the Celestion Blue and the Warehouse Black & Blue – interacted with the guitar very differently.

Feedback happened a lot sooner with the Warehouse speaker, to the extent that our ES-335 started to behave more like an ES-330 and was hard to control. The reason is almost certainly that the resonance frequency of the Warehouse (106.73Hz) is in the low-midrange danger zone that tends to promote feedback with a semi, while the Celestion's lower 75Hz rating is safely out of harm's way.

As ever, it's about the way your guitar, amplifier and speaker interact: you might find that a speaker with a higher resonance frequency adds punch to a Telecaster. If feedback is a problem when using your semi at volume, trying swapping your speaker for a driver with a lower resonance frequency rating before giving up on your guitar or amp.

2 LEARN TO USE YOUR CONTROLS

Here's a 'mod' that's completely free and takes no time at all: learn to get the best out of your guitar's onboard controls first before contemplating a pickup change. While almost everyone reading this will be familiar with rolling back the tone with gain to nail Clapton's 'woman' tone, there's another cool trick that works particularly well with an ES-335. In order to add depth to the bridge-pickup tone while retaining bite, first flip your pickup-selector switch to the middle position. Then roll the neck-pickup volume back a couple of notches, stopping at the point at which you hear the neck pickup's bass end shelve off. The result? You'll get a thicker version of your bridge-pickup tone without any flab – it's a fantastic rhythm sound that works particularly well for filling space in a live mix if you are the only electric guitarist in a band.

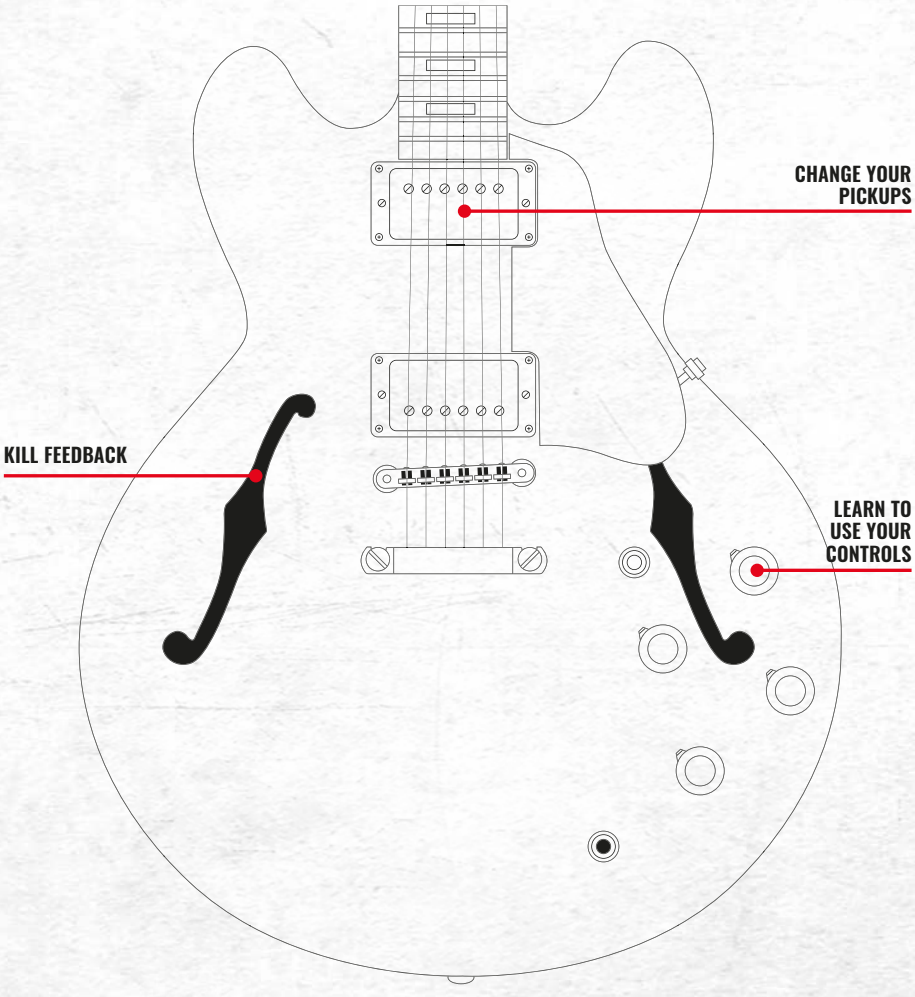
Vintage Trouble's Nalle Colt is primarily a Les Paul guy, but his advice is transferable for players who use vintage-style ES-335s: "I ride the volume control a lot, that's my whole thing. Since we started this band, I've liked to get kind of a gritty amp and then just turn down to get it to clean up. There's something so nice when you hear that volume go up and it just feels and sounds natural.

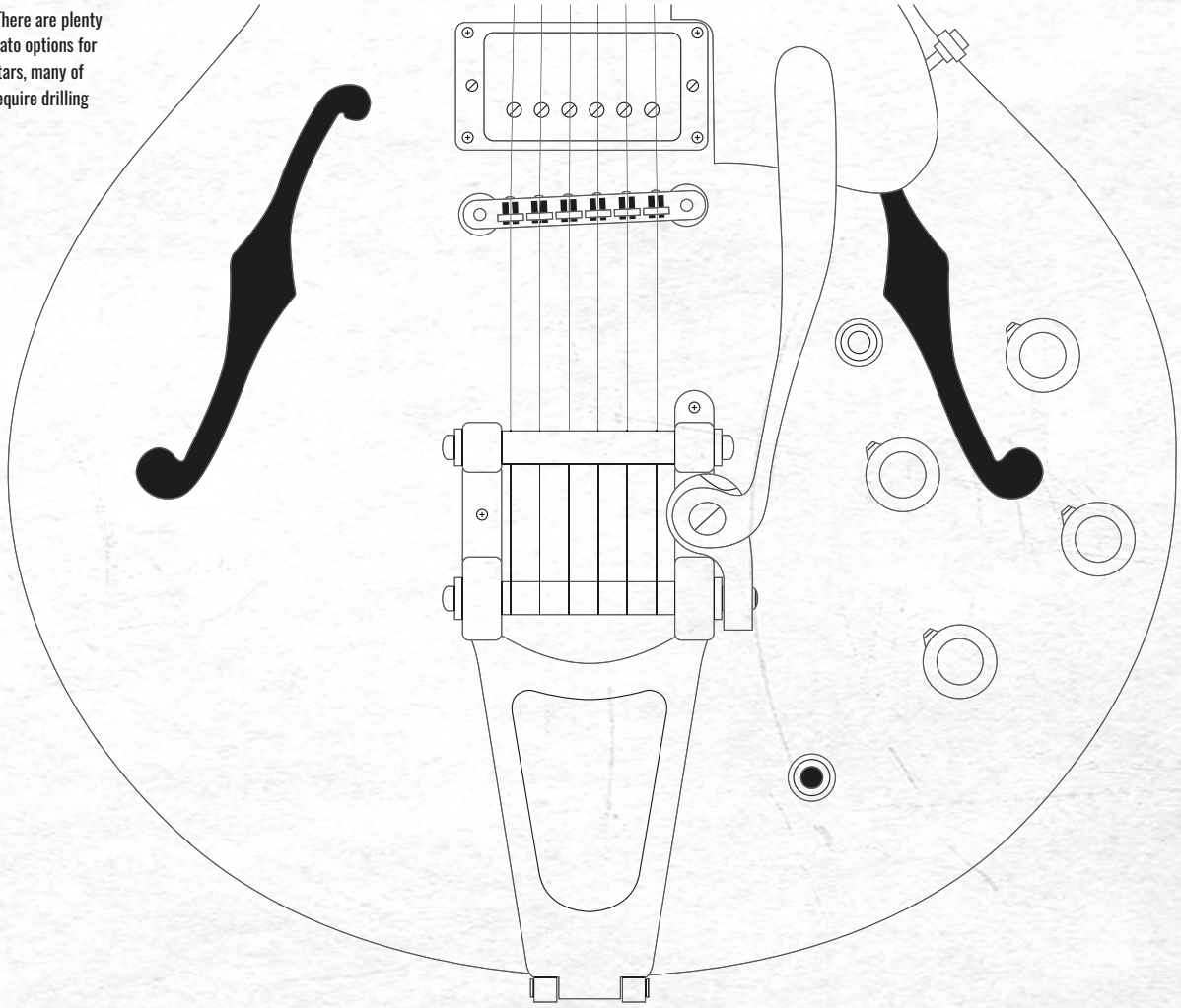
"[For rhythm] I'm usually set about five and a half or six on a Les Paul, in the middle position. Then you can just turn down the bass pickup a little bit – it's amazing. The stuff you can do is incredible, there's a thousand sounds in it if you are willing to work at it. You've got to fight the adrenaline, as usually you get onstage and end up just flipping it to the bridge pickup, but you've gotta train yourself! For me, it came from watching Jimmy Page play so much, he was the master of that."

3 KEEP YOUR NUT SLIPPY

We're not going to make many friends at retrofit-tuner companies now, but honestly, the majority of tuning difficulties have very little to do with your machineheads and are likely down to friction at the nut or bridge – you'll often hear a tell-tale 'ping' when tuning if a string is binding in the nut. This can be eased with a lubricant such as Big Bends Nut Sauce, or cheap and cheerful pencil graphite.

The choice of nut material itself is also worthy of consideration. As previously stated, nylon was Gibson's nut material of choice back in the day, while unbleached bone is the preferred choice for many contemporary luthiers. Aside from benefits to tone, sustain and tuning stability, it's also mildly self-lubricating and porous, so it absorbs any additional lube you apply and stays slippery, reducing friction. Most bone





BIGSBY B7 There are plenty of Bigsby vibrato options for 335-style guitars, many of which don't require drilling

used in the guitar industry is a by-product of animal farming – cruelty-free alternatives include Micarta (a compound of phenolic resins) and Tusq (a man-made alternative to ivory).

4 GET WOBBLE WITHOUT DRILLING

A Bigsby B3 or B6 doesn't have a tension bar, so you don't need to drill into the arched top of your beloved instrument for vintage-whammy fun. However, due to a very shallow break angle across the saddles, neither option creates much downward pressure on the bridge and you'll need to think about relocating the ground wire.

With the addition of a Towner Down Tension Bar (townerusa.com) you can create a stop-bar-like break angle over the bridge, but still get smooth Bigsby performance thanks to the Towner's roller bar. And you won't need to worry about the ground wire, as the Towner hooks onto your existing tailpiece studs, which you can adjust to taste. It's an ingenious 'best of both worlds' solution. If you want to install a Bigsby B7 on your ES-335 without leaving any trace or having to reroute the ground wire, then Vibramate's V7-335 kit (vibramate.com) doesn't require any drilling thanks to its system of mounting plates. The Vibramate hardware does add a little weight and there's a subtle colouration of the tone compared to a B7 that's been screwed directly into the body, but it's a great way to audition a Bigsby without creating sawdust.

For an alternative ES-335 vibrato option that doesn't require drilling and has a different feel to a Bigsby, check out the Stetsbar (stetsbar.com) or Duesenberg Les Trem (duesenberg.de).

5 OKAY THEN, CHANGE YOUR PICKUPS

If you've tried everything and your ES-335 is playing like a dream but still doesn't cut it when you plug in, a pickup change could be in order. Retrofit pickups aren't a silver bullet for all of your tonal ills – you might find that a very good set of pickups throws the shortcomings of your guitar into sharper focus in the same way that a high-quality microphone will only accentuate the imperfections in a dubious vocal performance – but if you feel like your pickups are constricting or strangling your guitar's natural voice, then there's never been more choice when it comes to replacements.

Early ES-335s came loaded with PAF humbuckers and the extended high-end, touch-sensitivity and harmonic content offered by a really good set of PAF-style units can be a revelation. Assuming you don't want to drop second-hand-car money on a set of vintage Gibson humbuckers, you won't go far wrong with Monty's PAFs (montysguitars.com), Tyson Tone's The Preachers (tysontone.com), Mojo Pickups 'Vintage' PAFs (mojopickups.co.uk), Lollar Low Wind Imperials (lollarguitars.com) or a set of Bare Knuckle's VHII units (bareknucklepickups.co.uk). G

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ESSENTIAL SKILLS 1

ADJUSTING YOUR TRUSS ROD

WORDS HUW PRICE

2

3

WHY YOU NEED THIS

Action unaccountably becomes too low or too high; intonation seems off; you're changing string gauge

WHAT YOU NEED

Large crosshead screwdriver; Allen key or socket wrench; two capos (optional)

There are times when a guitar that has been playing well suddenly feels 'a bit off'. Maybe the action feels higher than it was, or maybe it feels lower and you can't get notes to ring cleanly. Or perhaps you've noticed that the intonation isn't quite as sweet as once it was.

Guitars are made from wood and wood has a tendency to move around, depending on how hot, cold or humid conditions might be. This is most apparent when necks move, and since the middle of the last century, most guitar manufacturers have built truss rods into their necks to allow for subtle adjustments. Truss-rod tweaking may also be necessary if you decide to change string gauge.

Most necks have a small degree of up-bow, and you can gauge this 'relief' quite easily. Ensure the strings are all tuned to concert pitch and fret one string at the first and 14th frets simultaneously. You should see a small gap between the top of the fifth or sixth fret and the bottom of the string.

If the gap is larger than a millimetre or so, the neck may have too much relief and the action may feel as though it's too high. Conversely, a very small gap could mean there's not enough relief, and you may get buzzes, rattles or dead spots.

On vintage Fender-style guitars and many acoustics, truss-rod access is usually at the body end of the neck. With acoustics, you can usually reach in through the soundhole, but with electrics, you generally have to slacken the strings and pop off the neck.

Later Fender-style guitars, and pretty much all models based on a Gibson or Gretsch design, have the truss-rod access behind the nut at the headstock end. This allows you to tweak a truss rod while the neck is under tension. You can assess the results by playing the guitar. Depending on the guitar type, adjusting the rod may require the use of a large crosshead screwdriver, a socket wrench or an Allen key. Occasionally, manufacturers supply the necessary tool inside the case.

If your neck has a severe up bow or back bow, truss-rod adjustment is not the answer, and you should entrust the work to a guitar tech. However, minor corrections are well within the scope of the amateur, so long as you remember to move the truss rod only a quarter of a turn at a time.

To increase the relief, turn the truss rod anti-clockwise; and to decrease relief, turn it clockwise. Putting capos over the first and 15th frets (12th on acoustics) will allow you to gauge your progress. If you can get to grips with truss-rod adjustment, you'll be able to keep your guitar playing at its best, and you may save yourself the cost of unnecessary set-ups. G

1 Learning to tweak your own truss rod can save you having to take your guitar to a tech for a set-up

2 Truss-rod access can be found at the headstock and heel ends of necks. The USA Fender on the left is adjusted using an Allen key and the reissue on the right requires a screwdriver

3 This is the gap between the seventh fret and the string. The gap is big, therefore this neck has a lot of relief

© Getty Images

THE ALL-STAR GUITAR LESSON

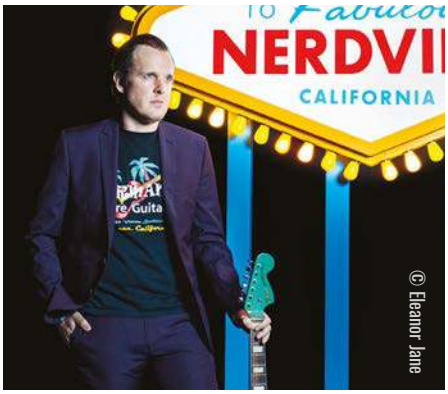
No matter where we are in our playing lives, every guitar player wants to get that little bit better. So here, we present some collected words of wisdom from the rockstars who are out there on stage every night in front of hundred, thousands or even tens of thousands of fans. Whether it's cleaning up your technique, sharpening up your soloing, writing better songs or improving your feel, these insider tips from the great and good of the guitar world will help make you a better player – and who knows, may set you on the way to your own rock 'n' roll stardom…

WORDS JOSH GARDNER

© Getty Images

GET YOURSELF A DECENT GUITAR
STEVE VAI
"You can get a great instrument cheap these days. You want to have something that will be able to stay in tune and have good intonation. The neck should be able to set the action as a low as possible without any buzzing, so it should have a decent and straight neck on it. Perhaps of greatest value is how the guitar makes you feel when you see it and hold it and put your fingers on it. It's a personal thing."

USE ACOUSTIC TECHNIQUES FOR MORE DYNAMIC ELECTRIC PLAYING
PATRICK SWEANY
"The dynamics and technique and attack… things that were so important to me on acoustic were still important on electric. You can add all these other things – where I'm picking, how I'm picking… the amped strength makes it all so much more impactful."



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IT'S OKAY TO OVERPLAY... SOMETIMES
JOE BONAMASSA
"I used to get really up my own ass and think about being subtle. But what I've found is, the people who come to my shows don't want to see that. We've been doing this song *Just 'Cos You Can Don't Mean You Should*. I way overplay on this song live, but people love it. If people clap, I feel like I've done my job."

LEARNING STARTS WITH YOUR EARS
ERIC GALES
"It sounds obvious, but I truly believe that 98 per cent of picking up something is just listening to it. I can teach them the mechanics of something, but once they've got that, it's down to what they hear. Once they have the tools, it's up to them to pull it into their own revision of what they want to hear."

IT'S NOT ALL ABOUT SPEED
JOEY SANTIAGO, PIXIES
"Mainstream guitar had a lot of typewriting skills. They were typing as fast as they can, and I couldn't hear it. The only thing that was impressive about it for me was the speed – how can they play so fast? I'm more like a classic-rock guy. You gotta hear some riffs or something you're going to remember, and that requires less notes."

"98 PER CENT OF PICKING UP SOMETHING IS THROUGH JUST LISTENING TO IT"

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DON'T FORGET TO LEAVE SOME SPACE
ED O'BRIEN, RADIOHEAD
"I love space in music, I love not playing! When we did our first album, everything was taken up, but by *OK Computer*, there was a lot more space – things were breathing, and that's where I'm happiest. I love the aggressive thing, but not the whole time – you can punctuate and annunciate, it's like light and shade."

YOU DON'T HAVE TO PLAY GUITAR LIKE IT'S A GUITAR
KURT VILE
"My dad got me a banjo when I was 14 and I used to play it like a guitar. It definitely informed my guitar playing subliminally. Because banjos are in an open tuning and they've got that high drone string. It's not like you'd even think about that when you're a kid, but I came to really like that ethereal drone."

"YOU HAVE TO BE DETERMINED TO LEARN THAT CERTAIN SOLO OR RIFF"

GIVE YOUR GUITAR SOME ROUGH TREATMENT
JD MCPHERSON

"When I was in my 20s, I bought a Duo Jet and I took it back, because I was afraid to scratch it! My opinion is that if you get your hands on a guitar that sounds great and feels great, you should wear it out. Let it live a life. Even if it's a vintage guitar, don't put it in a closet somewhere."

DON'T GIVE UP
BEN WELLS, BLACK STONE CHERRY

"You have to push yourself when you feel like giving up. You have to be determined to learn that certain solo or riff. Set some goals for yourself. Give yourself something to work up to, and once you accomplish those little goals, it'll make you feel proud of what you're doing."

TECHNIQUE ISN'T EVERYTHING
RIVERS CUOMO, WEEZER

"Most people don't really care about guitar technique. They're more interested in songwriting and singing. When I was working at Tower Records, they played music in there eight hours a day… and they weren't playing Yngwie; they were playing Sonic Youth, the Pixies, and all these classic rock and pop records."

© Eleanor Jane

PLAY SOLOS FOR PEOPLE, NOT TO SHOW OFF
RITCHIE BLACKMORE

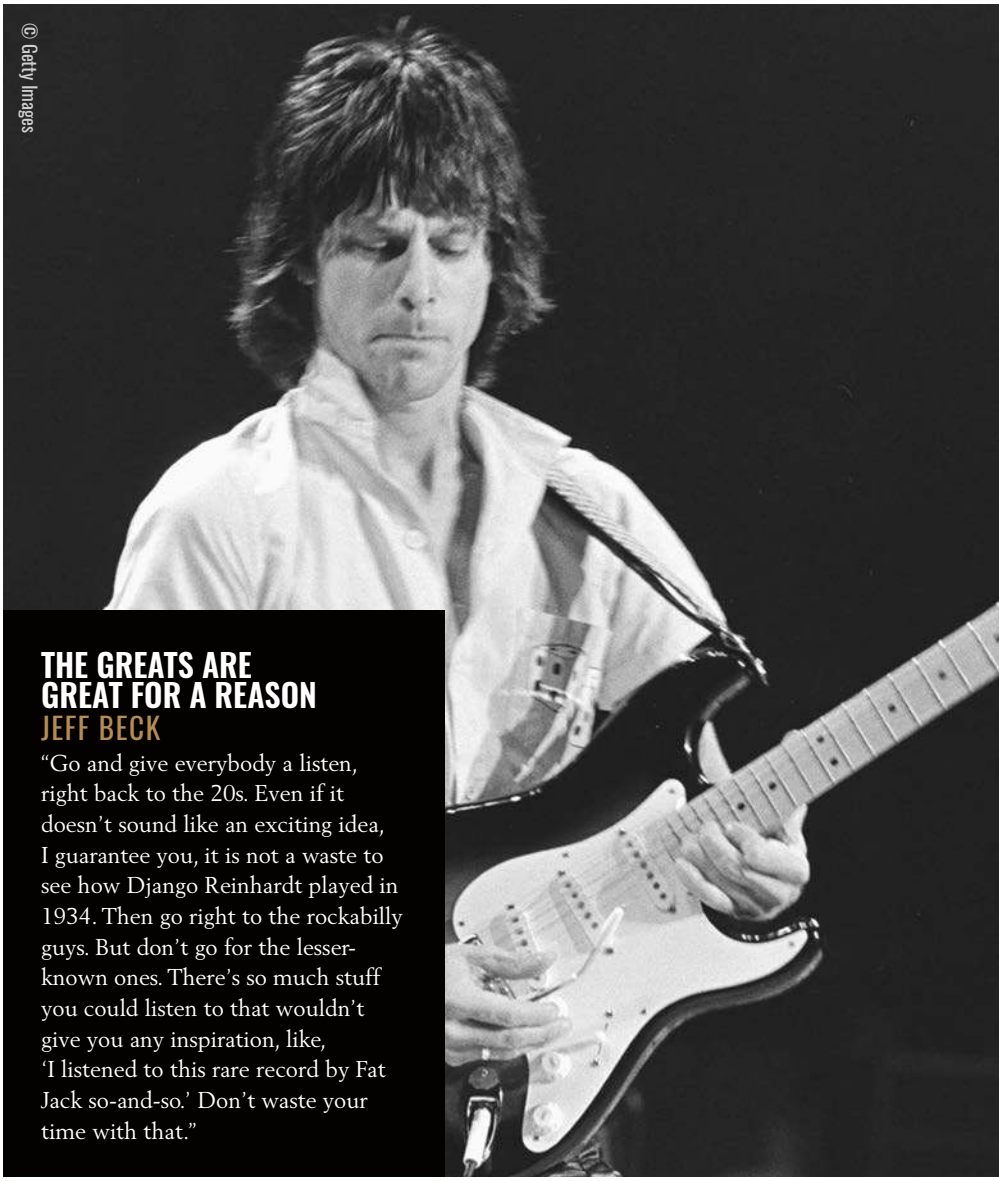
"I can't really stomach too many guitar players who just play these non-stop, incessant runs. It gets crazy; it's just exercises. There has to be a reason for soloing. If you try to play too technically, you lose something in the music – like you're playing for another guitarist. I like to play for people."

RECORD YOURSELF PLAYING
JOSH RAND, STONE SOUR

"Tape doesn't lie. When you're playing, you might not hear exactly how you're phrasing it. If you record yourself and listen back, you notice if you're sloppy in certain areas. It'll give you a different perspective, you might totally change ideas after listening to it, rather than just playing it. With today's technology, it's so easy, it's not like 30 years ago."

YOUR RIGHT HAND IS ABSOLUTELY ESSENTIAL
JD SIMO

"Spending time working on pick technique and hand strength is something you can exponentially improve, even in a month. You'll see a hell of a change, because our muscle reflexes are quick. It's those basic things that inherently make those players I look up to so special. Beauty in simplicity."



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THE GREATS ARE GREAT FOR A REASON
JEFF BECK

"Go and give everybody a listen, right back to the 20s. Even if it doesn't sound like an exciting idea, I guarantee you, it is not a waste to see how Django Reinhardt played in 1934. Then go right to the rockabilly guys. But don't go for the lesser-known ones. There's so much stuff you could listen to that wouldn't give you any inspiration, like, 'I listened to this rare record by Fat Jack so-and-so.' Don't waste your time with that."

EXPERIMENT WITH YOUR VOLUME KNOB
DAN PATLANSKY
"The longer you stick with one instrument, the better you'll know it and the better you'll play it. Also, if you solder a capacitor onto your volume knob you can get so many different sounds just by turning your volume knob up and down. Every notch of the volume knob has completely different textures. The lower my volume goes, the more jangly my sound becomes, because of the capacitor in there. There is a world of different textures in that cheap, simple mod. It's endless."

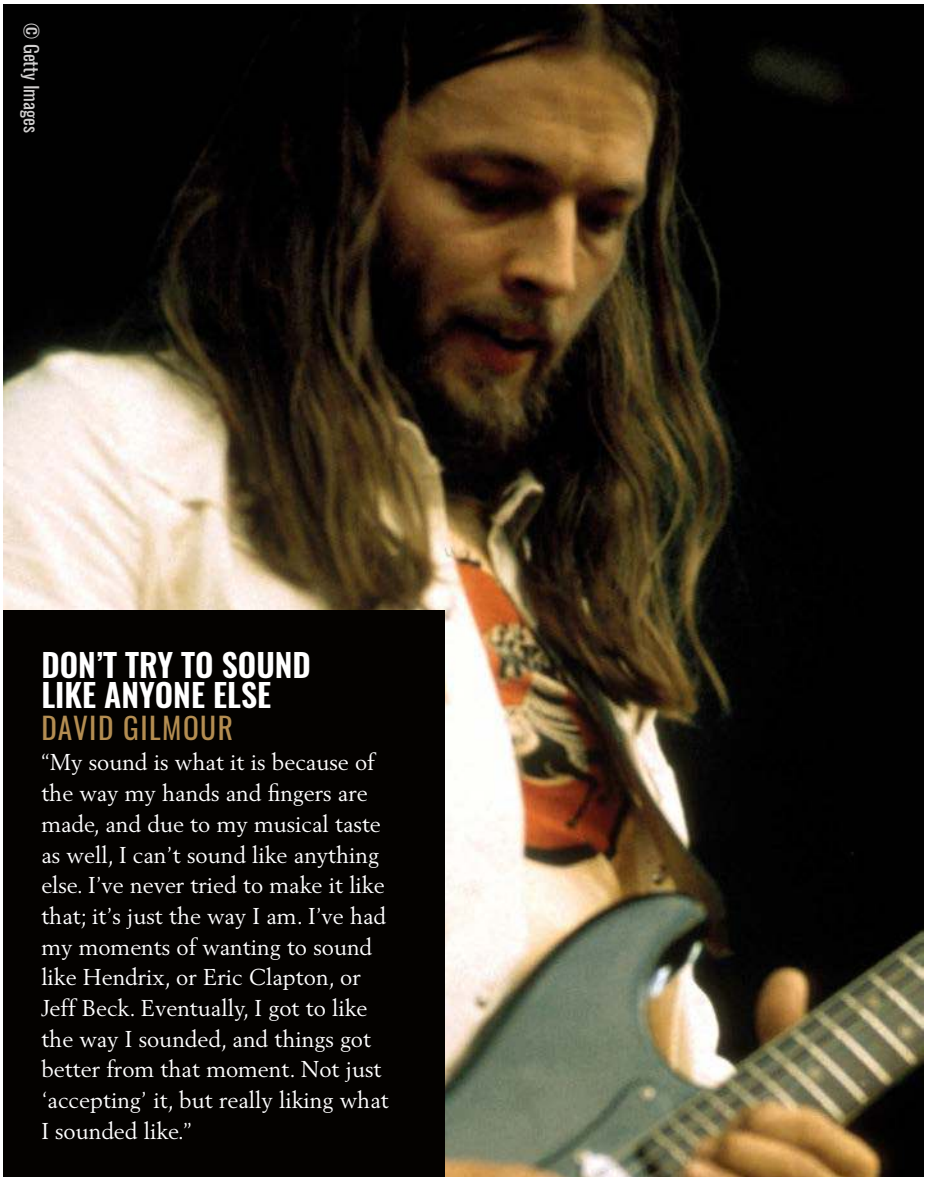
WORK ON YOUR VIBRATO
KERRY KING, SLAYER
"It's your own personal style, and how it evolves depends on how much you want to make it sing on its own. It has a lot to do with muscle development and getting calluses at the end of your fingers."

ADMIT NOTHING
WILKO JOHNSON
"If you play a bum note, keep a determined expression on your face and glare at the keyboard player!"

DON'T GIVE IT ALL AWAY UP FRONT
JOHN ETHERIDGE
"Stéphane Grappelli used to say to me when I played my best stuff in the first tune: 'Don't give it away – sell it.' Meaning, keep something back for later. Good advice."

MAKE YOUR SOUNDS COMPLEMENT EACH OTHER
JAMES MONTEITH, TESSERACT
"It's all about how the instruments interact together, it's basically trying to be one overall sound. There are no real virtuoso or 'this is me' moments: it's all about the whole thing working together."

DON'T WORRY ABOUT SWAPPING GUITARS LIVE
PAUL SAYER, ARCANE ROOTS
"I'd rather have the consistency of one instrument for a gig. I'd rather sacrifice the differences in sounds between guitars and manipulate what I've got than try and change guitars during the show. I like the challenge of less stuff."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DON'T TRY TO SOUND LIKE ANYONE ELSE
DAVID GILMOUR
"My sound is what it is because of the way my hands and fingers are made, and due to my musical taste as well, I can't sound like anything else. I've never tried to make it like that; it's just the way I am. I've had my moments of wanting to sound like Hendrix, or Eric Clapton, or Jeff Beck. Eventually, I got to like the way I sounded, and things got better from that moment. Not just 'accepting' it, but really liking what I sounded like."

© Eleanor Jane

ALWAYS SING YOUR SOLOS
JONATHAN WILSON
"You must be able to sing the solo, or there's an issue with the melodic component of it. I know so many guitarists that are great players and can mimic great melodies, but there is a disconnect between their hands and creating melodies. It's a gift. I think, and not everyone is connected to that."

LEARN HOW THE STUDIO WORKS
DIMEBAG DARRELL, PANTERA
"If you know how to turn knobs in the studio, then your guitar is going to come out like you want it to sound. Otherwise, you're at the mercy of whoever's running the damn thing, 'cause they can do whatever the fuck they want to it. It pays to be on top of your game, man, and know the ins and outs of all that shit and how it works."

GET OUT THERE AND GIG
MIKAEL ÅKERFELDT, OPETH
"Playing shows is more important than a band's Facebook page, ultimately, because you've got to be out there showing yourself in the flesh. Every fucking kid on the planet with rockstar dreams, the first thing they will do is start a Facebook page. It's more important to try to get shows. Be persistent, be a pain in the arse."

LISTEN TO OTHER GUITAR PLAYERS
OTIS RUSH
"You learn from listening to any guitar player. If you're interested in learning about music, you just pick up things from each other. And from that, you put it into your style.… We all play like one another, in a sense. If we all had to play our own music, there wouldn't be too many musicians!"

GET STRONGER
MARK TREMONTI, ALTER BRIDGE
"Rusty Cooley came up with his 'legato workout'. He used every single-finger combination of hammer-ons and pull-offs, all the way up the neck. It was all about building strength and dexterity. Then you slowly translate that into real playing. It was really vital to me for developing my legato skills. It's about repetition. Doing it over and over again."

TURN IT UP. WAY UP
JESSE WELLES
"If you want emotion, your amps have gotta scream and bleed. They have to sound fuzzy and hairy. They used to. Back in the day, the sound from a guitar amp was this big and nasty thing – that's how your solos became alive. I go right to my amp as a source. You should always go to the source. Your amp will speak to you if you give it a chance."

"IF YOU WANT EMOTION, YOUR AMPS HAVE GOTTA SCREAM AND BLEED"

© Eleanor Jane

THE RIGHT GUITAR CAN CHANGE EVERYTHING
PHOEBE BRIDGERS
"I love – love – open-tuned baritone guitar. It's perfect for how I write – it makes everything sound so sad! But it takes it out of the singer-songwriter world. Up until that point, I think because the way that my voice is and the chord shapes that I like, I'd been tuning a fuckin' acoustic guitar to C#! It was brutal!"

RHYTHM NEEDS PRECISION
JOHN PETRUCCI
"The cleaner and more precise it is, the more rhythmically accurate it is – that's when speed is at its most musical. So, for people practising that type of thing, I've always advocated working with some sort of solid reference, whether it be a metronome or drum machine, and working on subdivisions of beats. So when you play fast, you can lock it in to some sort of relevant subdivision within the music so that it doesn't just sound like nonsense. There's nothing worse than sloppy fast playing."

ALWAYS SERVE THE SONG
VINCE GILL, THE EAGLES
"The real purpose behind the guitar playing on a lot of those classic records was to serve the song. It wasn't just somebody out there blowing a bunch of riffs over some changes. All the guitar parts were beautifully thought out, very well composed and unbelievably memorable."

USE ALTERED TUNINGS TO GET YOURSELF OUT OF A RUT
JON GOMM
"Go into a new tuning you've never used before and try to write something immediately. Explore it a bit, but try to see what is possible just by moving your fingers around. It's a bit of a 'caveman' way of writing music, but it's very liberating and it's what a lot of the great songwriters from the past have done."

KEEP GUITARS IN DIFFERENT TUNINGS
DAVID CROSBY
"I play guitar every night and keep five guitars in different tunings in my bedroom, so I'll pick one up and start fooling around to see where it goes. If it takes me someplace I've never been before, I end up writing a song."

YOUR GUITAR SHOULD BE SPEAKING IN YOUR VOICE
HANK MARVIN
"When I'm playing a tune, I like to try to imagine I'm singing it and use phrasing that works for me. To feel I'm communicating something through the melody against playing it straight, or changing it so much that you lose some charm of the original."

NEVER STOP IMPROVING AND TRYING NEW THINGS
GEORGE BENSON

"Every day, I pick up the guitar and try to make a mental list of all the things I need to sharpen up on in terms of what's going on in the world today musically, without letting it take me too far off the deep end. I might be just looking to pick up a few things to add to what I already do. I may try to find a new device here or there, and then I'll woodshed on that and try to incorporate it into what I do. For a long time, I've been known for the way I play octaves and fast lines, but I had to work on those things for years before they were good enough to do in public. And if you discover one thing like that, it's invaluable… because people don't forget it."

GOING DIGITAL CAN KEEP THINGS MOVING CREATIVELY
RITZY BRYAN, THE JOY FORMIDABLE

"When you use loads of effects one after the other, it's easy to get lost in a 'gearhead maze'. It's not that you couldn't do that with an analogue setup, because you could, but it's whether you would get to that place as quickly and not lose some of the beauty of the momentum within that if you did."

LET YOUR SURROUNDINGS INFORM YOUR MUSIC
CHRIS STILLS

"While I was in France, I fell into a French way of approaching music which can be very different to the American way. When I went back to Los Angeles, I dove right back into my roots and the music that truly inspired me to want to do this in the first place."

STAY ON YOUR ROAD
PETE ANDERSON, DWIGHT YOAKAM

"Once I committed to being Pete Anderson, and was concentrating on me as a guitar player, I've been really conscious of staying on my 'road'. I'm just going to be the best Pete Anderson I can. I have certain techniques that are very unique to me, and I'm going to concentrate and expand on those. I'm going to expand on my tone, my right hand technique, my concept of harmony, and the way I play. And I'm going to blaze that trail as me."

© Getty Images

NEVER STOP LEARNING, ALWAYS TRY TO BE BETTER
ANDY SUMMERS

"You'll never master the guitar, and you'll never master anything. It's just too vast. But you keep going and you enjoy it. I've been playing all my life and I believe that I've had a very sincere and heartfelt approach to music. I've always really loved it. And I still believe I'm a humble student of the instrument and of music."

"I STILL BELIEVE I'M A HUMBLE STUDENT OF THE INSTRUMENT AND OF MUSIC"

CONTRAST IS THE KEY
MARTY FRIEDMAN

"When you're always at the same tempo and you're playing straight, fast and heavy the whole time, there's not a lot of contrast. Contrast just gives you a little break and surprises you with what comes next. So, those little surprises come in handy – especially when you do music without lyrics. You need other weapons to rely on."

IF YOU NEED TO PUT THE GUITAR DOWN, DO IT
GLENN TIPTON, JUDAS PRIEST

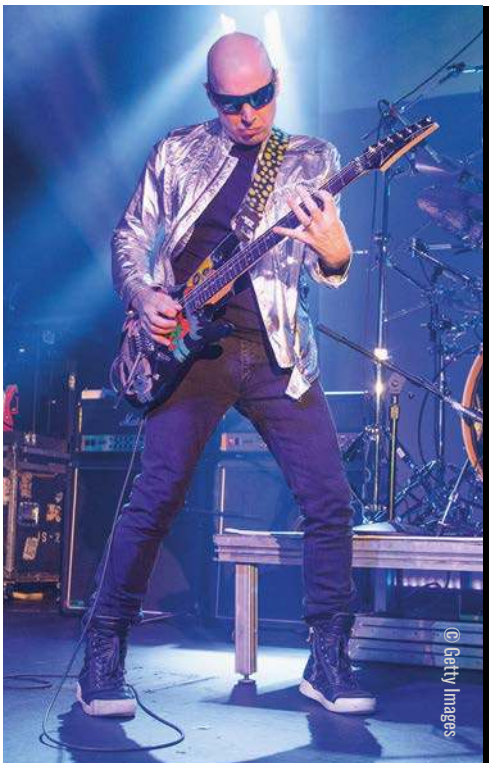
"I can get bored with the guitar if I'm not careful. I never want to get bored. So rather than play every day, I practise in bursts. And then when I want to rest, I put it down and go fishing. It makes me want to play the guitar, and when I want to play, I find I'm more productive, and come up with more ideas."

SONGWRITING KEEPS PLAYING INTERESTING
JEFFREY FOUCAULT

"That satisfaction you initially get from being able to play a chord without muting anything, there's a diminishing return. Then you learn other people's songs and that's really satisfying, but then there's a diminishing return on that… so you start writing your own songs."

DON'T COPY TOO MUCH
MICHAEL SCHENKER
"If a guitarist copies for too long, they create a groove. And you can't break out of it. You're stuck with someone else's style. The fun part of being creative is having no limits, and to do what you believe. It's about self-expression. And the purer the self-expression, the more we can find unusual things hidden in the ocean of infinite creativity."

THERE ARE NO SHORTCUTS
RICHARD LLOYD, TELEVISION
"It's about the man-hours. They did a study of classical symphony players, and found that first-chair violinists had put 2,500 man-hours more than the second-chair people. It made a vast difference when I learned that. Now, whenever I hear someone banging away at a guitar sounding like crap, I just think to myself, 'You've got 9,800 hours to get good'."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IF YOUR PRACTICE IS EASY, IT'S NOT HELPING
JOE SATRIANI
"I've spent so many years learning so many fingerings, every time I go to do it, I just pick the version I didn't use the last time. But after a while, you realise that it bores you because you can do it. If you're doing it flawlessly, what's the point? You're not challenging your fingers. Usually, if you ask someone: 'Do you know how to play a harmonic minor scale?', they'll pick their favourite key and play it in two octaves. That's not what I'm talking about. I mean knowing like in the Biblical sense. And that's what the great musicians talk about: to know music is to know that thing inside and out, to know every nook and cranny of the scale, where it exists."

TRY SOMETHING DIFFERENT
GEORGE LYNCH
"Maybe forget some things, learn some new things, and change! I don't want to be the same guy every time I pick that thing up, and start to bore myself to death. But it's tough, because reinventing yourself, even in a minor way, is painful. Maybe you're not so good at this new thing, so you've got to try to get good at that."

AUTHENTICITY IS KEY
RICH ROBINSON, THE BLACK CROWES
"The best advice is to be sincere, don't fake it. No one can really write for anyone else, no one has your experience, genetics, upbringing, struggles and triumphs as a human on this planet. As long as you stay sincere, just write things that mean something to you."

DON'T FORGET ABOUT DYNAMICS
PAUL GILBERT
"You wouldn't believe how many guitar players do not use any dynamics. And it's not just a big section of loud and then a big section of soft. It's a constant up and down of different tones, volumes and space. And it makes a huge difference. Just that alone can separate the amateurs from the pros."

BUILD YOUR FOUNDATIONS
YNGWIE MALMSTEEN
"I think it's important to know theory and harmony, the scales, the relative keys, and learn how to improvise. These are hard things to learn. But there are different goals that people have. My question often is: 'Do you want to be good, or do you want to be famous?' If you want to be good, you might not get famous!"

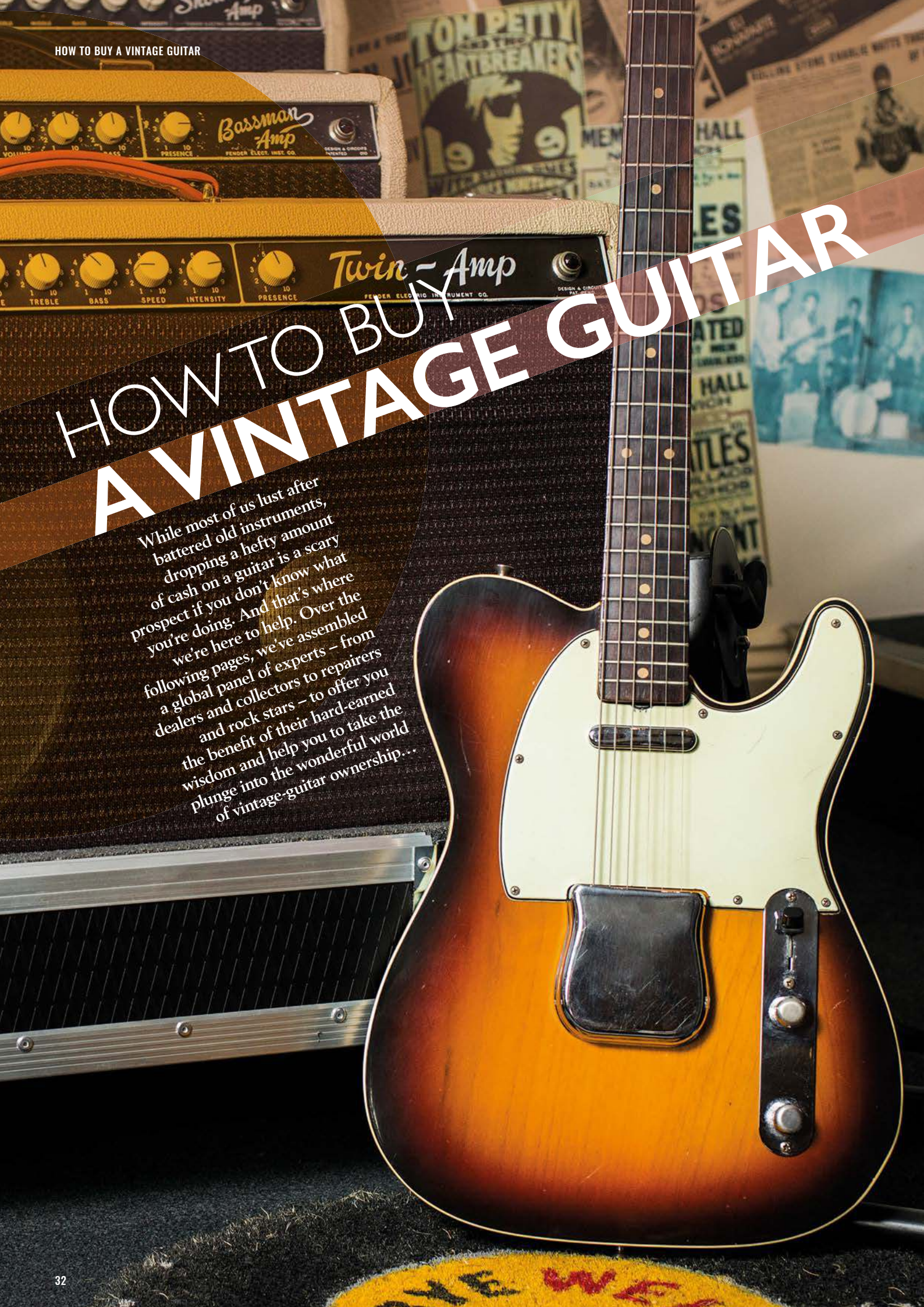
GO SLOW AND STEADY
TOMMY EMMANUEL
"If you've never done something before, then you have to go slow and work out an exercise that will get you moving in a smooth way. So you teach yourself how to do exercises that will help you turn the skills into music. I want to play music! Don't get caught up thinking, 'I've got to be in the gymnasium of the guitar world to get any good.'"

"DYNAMICS ALONE CAN SEPARATE THE AMATEURS FROM THE PROS"

KEEP IT SIMPLE
CHARLIE STARR, BLACKBERRY SMOKE
"You can clutter a song up with too many ideas. I try to be a good editor of myself. You'll say: 'We don't need this change here, or this part', or the opposite: 'We need another turnaround here' or, 'We need something to happen, it feels as if it's a little empty'. Those things usually work themselves out."

GET THE RIGHT STRINGS
ARIEL POSEN, THE BROS LANDRETH
"Throw some heavier-gauge strings on your guitar. Lots of people use tunings such as DADGAD, open D, open C, and so on. When you tune down so low, the strings get loose and don't handle tunings as well. If you're primarily in standard tuning or open E, you shouldn't have to go higher than 0.011s."

IT'S MORE THAN THEORY
GUTHRIE GOVAN
"If you sit down with a scale book, you'll end up knowing all these shapes, but it's just a cold morsel of theory. The musical player isn't there anymore. If you can't sing or feel it, then you don't really own that scale. You just memorised the shortcut. The process has to be imagining music, then being able to play what you hear in your head." G



HOW TO BUY A VINTAGE GUITAR

While most of us lust after battered old instruments, dropping a hefty amount of cash on a guitar is a scary prospect if you don't know what you're doing. And that's where we're here to help. Over the following pages, we've assembled a global panel of experts – from dealers and collectors to repairers and rock stars – to offer you the benefit of their hard-earned wisdom and help you to take the plunge into the wonderful world of vintage-guitar ownership…

MEET OUR EXPERTS

MICHAEL JAMES ADAMS
Formerly the co-owner of Seattle vintage guitar repair and restoration specialists Mike & Mike's Guitar Bar, Mike now lives in Long Beach, CA, playing guitar with the likes of VAVÁ, Kali Kazoo, and Fellow Robot, as well as regularly contributing to *Guitar Magazine* and *Fretboard Journal*. He knows more about old Jazzmasters and the guitars of Rivers Cuomo than anyone else we know.

KRIS BLAKELY
The man better known as Fried Okra on Instagram and the Les Paul Forum, Mississippi native Kris has assembled one of the coolest guitar collections ever featured in this publication. His inventory includes everything from 50s Strats and Teles to 1930s Gibson acoustics, as well as a 1959 Les Paul previously owned by Paul Kossoff.

JOE BONAMASSA
A man who surely needs no introduction. Joe is not only one of the most popular and respected guitar players in the world today, but also one of the most prolific collectors of vintage gear – and a man who has owned and played more 1959 Les Pauls than practically anyone else on the planet.

JAMES GAY
James is the guitars manager at Well Played Gear, Singapore's experts in used and vintage guitar gear. Prior to joining WPG, James worked for legendary Nashville guitar repairer Joe Glaser, where he serviced, repaired and restored guitars for some of the most legendary artists in the business.

ED OLESZKO
Guitar Magazine contributor and vintage guitar obsessive Ed is probably the only person you'll ever meet who takes 1950s Gibson Les Pauls and a 1951 Fender V-Front Super out for a function-band gig. Ed's also one half of the 'Tone Twins' YouTube channel, where Ed and *Guitar Magazine*'s own Huw Price get extremely nerdy about vintage guitars and amps.

DAN ORKIN
Dan Orkin is director of content at Reverb, the online marketplace for buying and selling new, used and vintage music gear. One of the first employees to join Reverb, Dan has helped the team produce thousands of articles, videos, and more. A go-to for sales trends and pricing data, Dan also edits the Reverb Price Guide.

JOHN SHULTS
The proprietor of True Vintage Guitar in Birmingham, Alabama, John Shults bought his first vintage guitar – a '72 Martin D-35 – back in 2009, and has been obsessed with them ever since. Since 2014, he's been driving all over the Southeastern United States searching for vintage guitars to buy and restore, documenting their stories and journeys on his popular Instagram account.

ABOVE Collector Gary Gand picked up this 1964 Gibson Gibson SG Custom when he joined a jam band

OPPOSITE, TOP Vintage combinations don't come much more classic than a P-90 Gibson and a roaring Marshall amp

OPPOSITE, BOTTOM Vintage-guitar collectors love a little candy in their case. This '63 Esquire from ATB Guitars (atbguitars.com) came complete with a period-correct instruction manual

GUITARIST, KNOW THYSELF

James Gay, Well Played Gear

"Are you a player, or a collector? For a player, the biggest thing is that the instrument still functions. If it doesn't function properly, playability goes out the window. I'm talking specifically about things like the truss rod (if it has an adjustable one) working, if there are any obvious signs of damage to hardware or structure, does it have fret issues that need to be addressed, etc. It's important to make sure the 'bones' of the instrument, so to speak, are still good.

"For a collector, the priorities shift a little bit. Their chief focus mainly becomes that things haven't been modified, regardless of playability. Signs like if it's been refretted, if the electronics have been changed or replaced, if the hardware has been swapped out. Has the finish been touched up on certain areas, hiding a repair (ie a headstock break), things like that all affect the potential value of the guitar."

LOVE IS THE KEY

John Shults, True Vintage Guitar

"Buy what you love. A lot of buyers get hung up on which guitars or amps have better investment potential and lose sight of the reason they are looking at guitars in the first place. You'll always be best informed on the guitars and gear that you love. Allow yourself to get side-tracked on whatever gear is occupying your headspace. You can't really predict the future value of anything, so you might as well have what you love!

"If profit or investment potential is your sole reason for buying vintage, then you will likely have a bad experience. Profit and investment potential are sometimes a bonus when owning vintage, but they're not the reason vintage gear is fun."

KNOWLEDGE IS POWER

Ed Oleszko

"Do your research, knowledge is power. Read, read and read some more… research pictures and video. Get to know the minute details of the guitar model you're thinking of buying, down to the last screw and assess its current condition and originality compared to a 100 per cent stock model.

"If you can't physically check out the guitar in person, then ask for lots photos of every detail (inside and out, including under 'black light'). I'd also ask for video and sound. If you are well-read, armed with research and knowledge you are in a stronger position to assess the guitar's condition, quality and originality and ultimately, therefore, its fair value."

DON'T BE AFRAID TO ASK QUESTIONS

Dan Orkin, Reverb.com

"If you see a listing that indicates some sort of damage either in the description or photos, don't hold back from asking more questions and getting specific. When buying vintage online, it's really important that buyers feel empowered to communicate with sellers to address any questions or concerns, whether you're buying from a pro shop or an individual.

"When using Reverb, for instance, it's really easy to initiate a conversation with the seller on any listing on the site. If you have any concerns or need more details, it's way better to communicate that up front. Plus, most people who sell vintage guitars online are really passionate about it, so usually will share some of that passion for the instrument with you as part of the process."

REMEMBER WHAT IT'S FOR

Michael James Adams

"The most common pitfall I see among vintage-guitar buyers is the tendency to treat old instruments like religious artifacts or priceless relics. True, vintage guitars can be thrilling to hold and play and some do have an innate sense of history that's compelling. But at the end of the day, they're still just wood and wire, so it's important to temper your expectations.

"For instance, I see so many folks write off guitars that aren't 100 per cent original, but unless your goal is to collect and maintain an absolutely pristine collection, changed tuners, modern potentiometers, and even a fresh coat of paint shouldn't dissuade players from picking up the guitar of their dreams. Those things can also bring huge savings, so keep an open mind and understand that guitars are meant to be played and anything that comes into contact with human beings is bound to have a few issues."

BRING A PROFESSIONAL

James Gay, Well Played Gear

"I always recommend spending some time with the instruments in person before committing to a purchase. If you don't know how to do things like adjust a truss rod, or give an instrument a basic setup, asking to have the guitar inspected by your luthier/guitar tech would be a great idea, just so they can make sure everything is structurally sound."

BEAUTY CAN BE SKIN DEEP

Michael James Adams

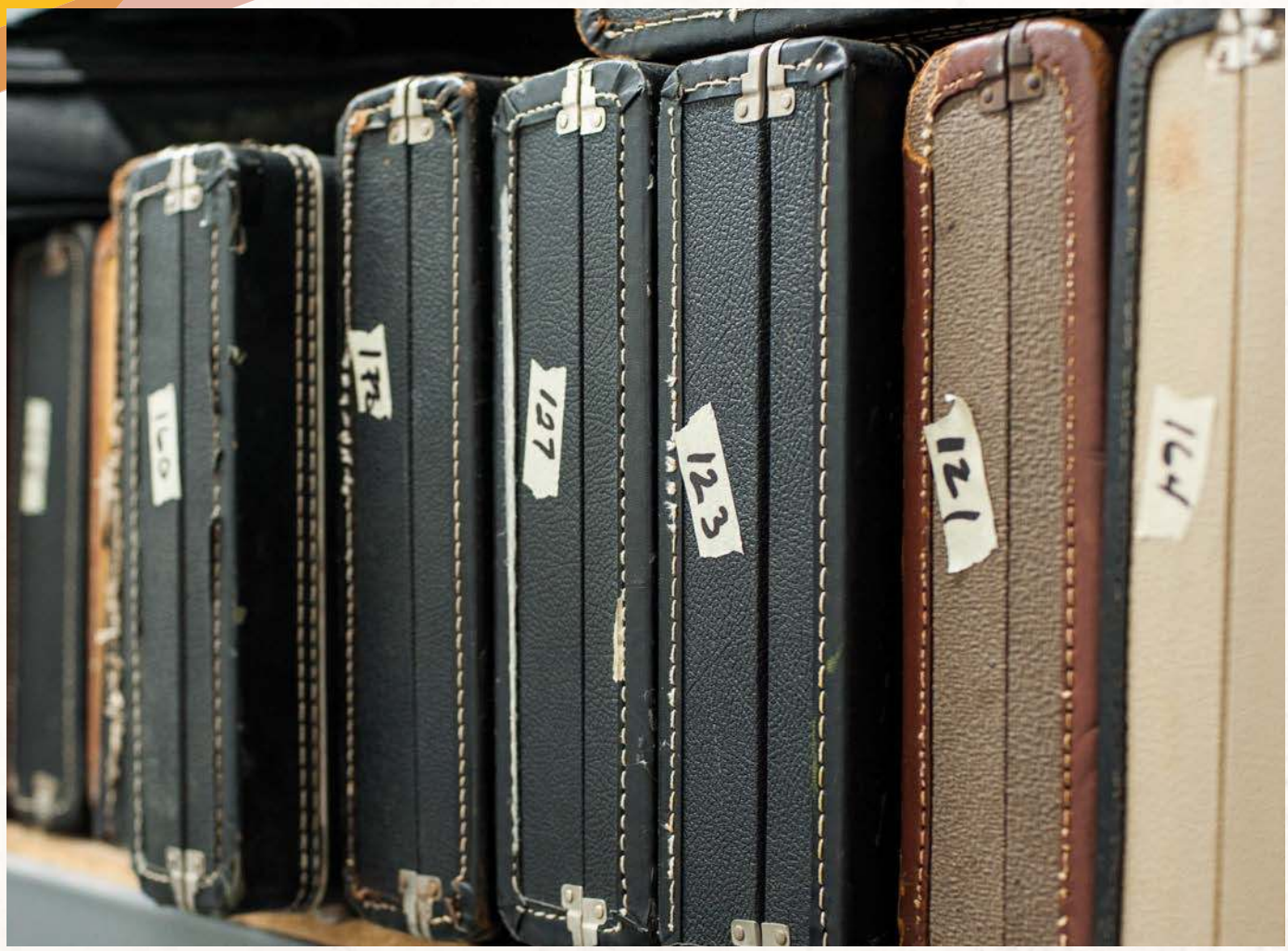
"One thing to be aware of with refinished guitars is that sometimes the new finish may be hiding modification scars, but if you hold the body in the light at the right angle, a good reflection can often highlight the otherwise undetectable lines of filled-in routs. And if you're not sure whether or not a guitar is refinished, make sure you're familiar with the available colours of the era as well as what those shades actually looked like at the time.

"For instance, there's a lot of argument about what constitutes a proper Fiesta Red, but there's definitely some variation in the paints used, as well as how an aged clear coat can change the hue."

EVEN 'ICONIC' GUITARS WILL NEED SOME TLC

James Gay, Well Played Gear

"I've seen a lot of people focus so much on a specific year or range of years. For example, everyone knows



ABOVE Vintage-guitar collectors can sometimes pass up great buys because they're not 100 per cent original – yet a few mods here and there can add to the charm and also represent an opportunity to get a better deal

OPPOSITE Auctions can be a great opportunity to grab a vintage bargain; this pair of 1960s Fenders featured in a recent sale at Gardiner Houlgate

that a pre-war Martin is like the Holy Grail of dreadnought acoustics. But that doesn't necessarily mean all of them are going to be great right away. Decades-old instruments often end up having all sorts of hidden issues, either due to string tension and its effects over a generation, or even due to haphazard luthier experiments gone wrong.

"Sometimes, even a guitar that appears restored from the outside could end up needing a good workover by someone with a real eye for vintage instrument restoration before it truly sings the way it's meant to."

TODAY'S TRASH MIGHT BE TOMORROW'S TREASURE
Kris Blakely

"I'm funny about telling someone to shy away from a particular vintage instrument, because what's not hot today, might be the hottest vintage guitar on the market tomorrow. Also, it depends on what you may like and your bank account. If you were just hankering for a vintage guitar, but your finances are limited, then think about a well-worn vintage guitar. Those are cool and usually more available at reasonable prices."

BE CAREFUL WITH BUDGET BRANDS
Dan Orkin, Reverb.com

"I would be careful with older, lower-end archtops from budget brands. They look great and some of them are fantastic guitars, but if buying online especially, it can be difficult to assess how playable they are ahead of time as they are prone to damage over time.

"That said, there are often great buys to be found in the lesser-known models or eras from key brands. Also buying the category of guitar that a brand isn't super well-known for can yield some great value. For instance, people think of Guild electrics a lot less than their acoustics, but some of the 60s and 70s Guild electrics are really excellent buys."

TRUST YOUR GUT
Kris Blakely

"I see and hear of this happening all too often. You find the one, it has a story that really intrigues you, like the old, 'It was my grandfather's guitar' thing. Yeah, it could be, but where is the provenance? If something in your gut tells you something is amiss, I find it best to sleep on it – and it's so important to not be afraid to ask questions."

IT'S A GOOD TIME TO GET ONBOARD...
John Shults, True Vintage Guitar

"After the peak in 2008, the vintage market appears to be steady and growing at a reasonable pace. This is best for both buyers and sellers, because it makes the market safer to participate in.

"Vintage instruments have been historically an excellent investment, but that shouldn't be the sole reason to participate. Your motivation to participate should reside in your love and passion for music and the gear that made it possible." *G*

FENDER

JOE BONAMASSA

FOR THE LOVE OF A GUITAR

If you want to know something about buying vintage guitars, there are few better people to ask than Joe Bonamassa… so that's exactly what we did. Writing exclusively for *Guitar Magazine*, Joe gives us his top tips for buying vintage

WORDS JOE BONAMASSA **PHOTOGRAPHY** ELEANOR JANE

Hey guys, I've been asked to write a few words about collecting guitars and to offer a little advice about my process of collecting them, and so here are five points that will help you in that endeavour:

1 ORIGINALITY AND HISTORY

When purchasing from original owners, you should understand that you are buying a story as well as a guitar. Each guitar has its own incredible history and provenance which may include photos of the original owners from back in the day, manufacturer and dealer tags, as well as its own musical legacy. Likewise, you will often encounter an unfortunate lineage of undisclosed issues, repairs and disgruntled former owners that feel cursed by their ownership of that particular instrument.

You want to seek out the former and avoid the latter. One of the first questions I ask myself is, "Does this guitar's originality add up as total package and is it proportionally aged from the case down to the string saddles?" and "Does it have a history I want to embrace?"

2 DON'T GET INTO IT TO MAKE MONEY

Guitars can be great investments over time, but they shouldn't be treated as 401ks, stocks or commodities. I have a joke that goes: "What do you call a guitar collector who just sold one of his guitars for a dollar more than he bought it for?" Answer: "A guitar dealer." If your primary motivations for collecting guitars are a quick flip and fast money, it can get one into dangerous territory where you will expose yourself to the best *and* the worst elements of the business. For many folks, the profit becomes more important than refining a collection that you truly enjoy and love.

3 BUY WHAT YOU LIKE

I love solidbody guitars made by Fender and Gibson from the years 1950 to 1965. That's what I collect, seek out and cherish. It is good to diversify a little bit, but never let other people spend your money for you. I get asked all the time: "Joe, when are you gonna get into this brand or that model?" I always tell them that collecting is a highly personal thing and at the end of the day, you alone have to be happy with what you purchase. Don't be concerned about 'keeping up with the Joneses'.

4 KEEP IT FUN

The minute a deal gets confrontational, or someone is shouting at me or insinuating they know more than me (which they probably do) or making the negotiation an unpleasant experience, it takes all the fun out of buying that instrument.

The seller usually dictates the terms of sale, so periodically, I get some strange requests. On occasion, I have been asked to bring a bag of cash and meet in a Del Taco parking lot (or something similar) in the middle of the night. When sellers make it too difficult, I'm out. This is supposed to be fun and the minute you own the guitar after a deal like that, you begin to resent it and feel the whole thing was done under duress.

It's a killjoy. It's honestly better to just walk away. If there is one thing I know about this collecting thing, it's there is always going to be another deal and more stuff to buy.

5 DON'T BE A LAZY COLLECTOR

The best thing is for every collector to do their homework. By that I mean, be a shrewd buyer, know the instruments you're buying inside and out. Know the right people to buy from and try to avoid the ones who are not trustworthy. Know more than you need to, because you will see anomalies and things that are not in the books or on the internet. Have a trusted circle of knowledgeable friends you can check with before you make a purchase.

Be confident so as to not buy into myths and hearsay and false information that has been disseminated through the internet forums and elsewhere.

Experience, knowledge and the advice of other learned collectors will help to make wise choices and to know an original guitar when you see one. All of this takes patience, work and dedication. If you follow my advice, you'll build a collection of instruments you will be proud of and enjoy. Play well, be safe, play loud and have fun! G

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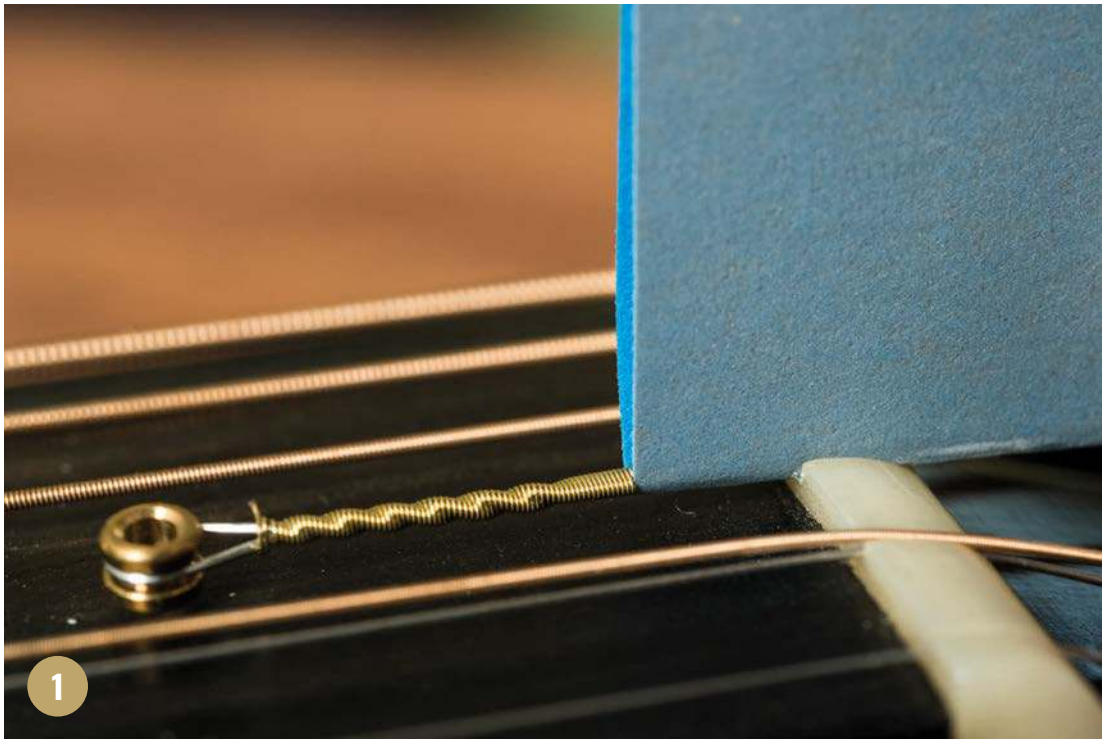
ESSENTIAL SKILLS 2

ELIMINATE NUT PINGS

WORDS HUW PRICE



WHY YOU NEED THIS

Audible clicks and pings when you tune up or bend strings; unstable tuning

WHAT YOU NEED

Wet & dry paper; polishing compound; lubricant

1 While professional luthiers and techs will own a set of fret files to do this job, you can improvise by wrapping some 1000-grit or finer wet and dry abrasive paper around the string and use it to smooth the slot

2 Having masked off the fingerboard and headstock, the nut slots are then polished with Autosol chrome cleaner

3 After smoothing and polishing, you can add some lubricant to the slot. Big Bends Nut Sauce is a popular brand and it soaks into bone to keep it slippery

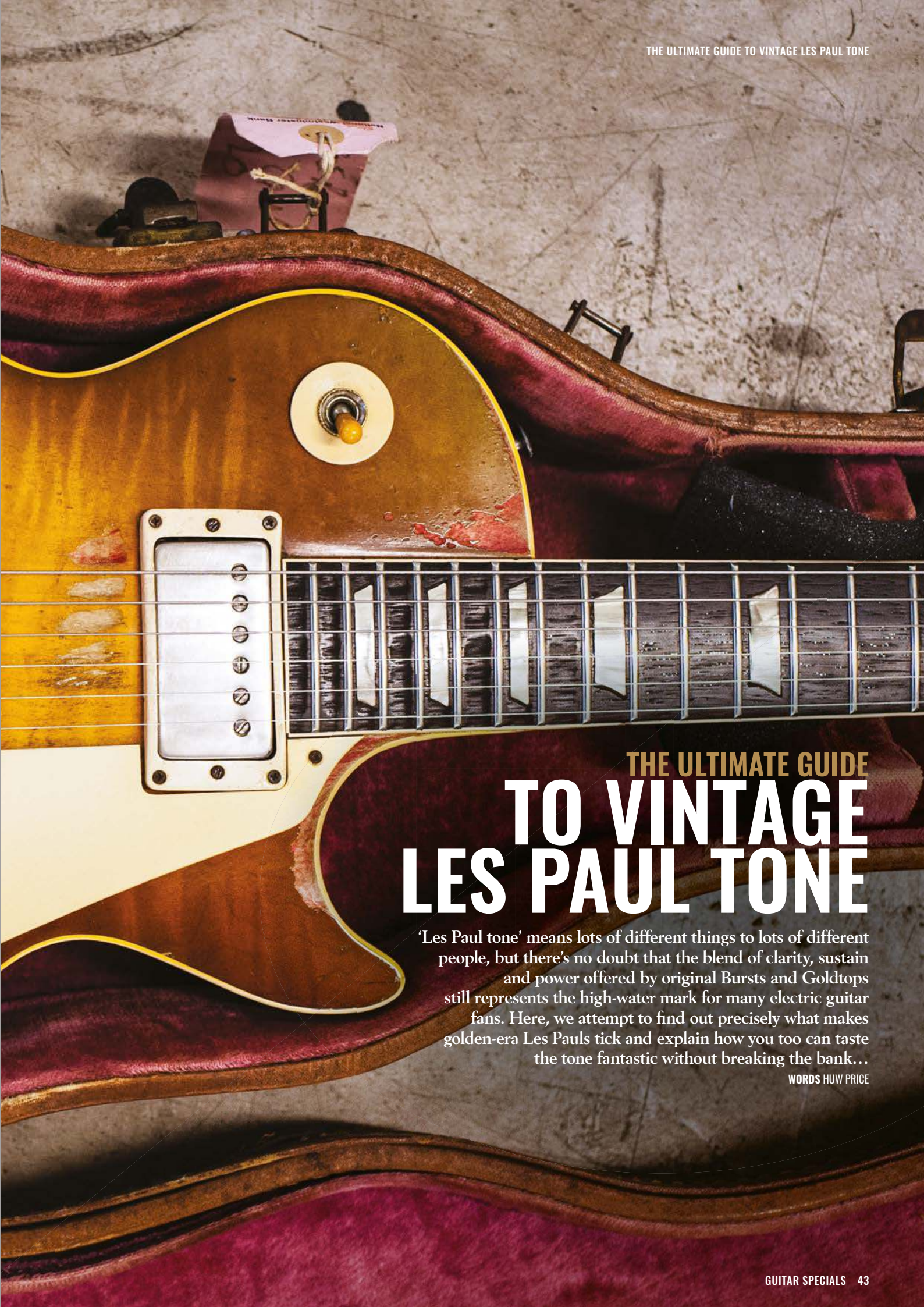
There's no denying that tuners wear out, but countless vintage guitars have been fitted with Schallers and Grovers that they never really needed. Machineheads are often blamed for unstable tuning, when the real cause is friction in the nut slots.

Have you ever played a guitar that makes pinging and clicking noises when you tune up? Or maybe you can feel the string slipping between grooves in the nut slot when you bend it. Listen closely when it happens and most likely the noises will be emanating from the nut.

Luthiers use special nut files to smooth and finesse nut slots, and most hobbyists will consider a set of nut files too expensive. Instead, you can take a small piece of 800 or 1,000 grit wet and dry abrasive paper, wrap it around the string and push it into the offending slot.

The idea is to smooth the surfaces of the slot and not to deepen it. Work the paper back and forth a few times, then pop the string back in to test your progress. Don't rush this, just be patient and keep checking.

If you manage to improve the slot, try following up with some still finer micromesh. You can even mask off the neck on both sides of the nut and finish off the slot using chrome polish. To further reduce friction, try introducing some lubricant into the slot. Some people use graphite from a soft pencil, while others prefer to use Vaseline. You can also buy specialist guitar lubricants, such as Big Bends Nut Sauce or Guitar Grease. G



THE ULTIMATE GUIDE

TO VINTAGE LES PAUL TONE

'Les Paul tone' means lots of different things to lots of different people, but there's no doubt that the blend of clarity, sustain and power offered by original Bursts and Goldtops still represents the high-water mark for many electric guitar fans. Here, we attempt to find out precisely what makes golden-era Les Pauls tick and explain how you too can taste the tone fantastic without breaking the bank…

WORDS HUW PRICE

Once upon a time, we were checking out a 1960 Les Paul Standard and made the bold claim that anyone could enjoy something unnervingly close to vintage Les Paul tone by combining the right pickups, hardware and electronics with a suitable body. Unsurprisingly, we've since been asked to put our money where our mouth is and show you how.

So, over the following pages, armed with an original 1954 Goldtop, a Gibson Custom Collector's Choice #26 Whitford Burst and our work-in-progress Greco LP-style that we're in the process of converting into a Goldtop, we've compiled a step-by-step guide to achieving vintage Les Paul tone without having to sell your house in the process.

One thing before we start. If you are shooting for that authentic 50s Les Paul tone, we think that success is more likely if you consider things as a whole rather than obsess over specific details. The electric guitar is a 'system' and, as with all systems, individual components interact. Identifying the key components and gaining insight into how they work together is essential. Read on for an analysis of what we consider to be the key components, the way they affect tone and what your options are.

HARDWARE

A significant proportion of vintage Les Pauls were retrofitted with Grover or Schaller machineheads at some point – many have since been converted back to Klusons. The balance of the guitar changes with heavier tuners and you may notice changes in transient attack, but it's hardly a make-or-break issue. The same can be said for nylon nuts: if you do notice differences compared to bone or other materials, you'll only hear them when you play open strings.

Consequently, attention focuses on bridges and tailpieces and we conduct our primary listening tests with the guitars unplugged. We've always found vintage Gibsons a bit softer in the treble and woodier in the mids than even the best reissues. With the electrics eliminated, these differences can only be attributed to the wood, the bridges and tailpieces – or a combination of both.

We test the hypothesis by swapping the original wrapover tailpiece and studs from the 1954 Goldtop onto our Greco and putting the Greco's Faber aluminium tailpiece onto the Gibson. The strings on both guitars are identical sets of Ernie Ball Pure Nickel 0.010s. The results are clear, with the Greco now sounding like a vintage Gibson and the Gibson

taking on the snap, brightness and chime of the Greco. Many would regard the sonic characteristics of the Faber tailpiece as superior, but it's less 'vintage' and vocal sounding and doesn't sustain quite so well.

Moving over to the Collector's Choice LP, we swap the bridge for an ABR-1 taken from a 1961 ES-330. The changes are less dramatic, but still clearly audible. We hear a softening of the treble, which leads to a more vocal midrange and a compressed warmth. The model's owner declares that the vintage ABR-1 has "taken the newness off the guitar", and promptly begins scouring the net for vintage bridges.

Since both wrapover bridges are aluminium, we must conclude that the grade of aluminium being used by Faber differs from the aluminium Gibson was using during the 1950s. Research suggests vintage ABR-1 bridges were cast from an alloy called zamak – containing zinc, aluminium, magnesium, and copper – and there are eight grades of zamak. Collector's Choice bridges are described as 'zinc', but again we suspect the composition may be slightly different.

Vintage PAFs and P-90s (and accurate replicas) tend to be very microphonic, so many of the guitar's unplugged tonal characteristics make it to the amp and they have treble to spare. Therefore, hardware is an important factor in the Les Paul tone equation and your options are to buy vintage parts or find replacements that sound like vintage ones. This area could benefit from more research.

POTENTIOMETERS

Saying that vintage Les Paul controls 'just work' would be a touch simplistic, so let's be specific. Assuming they're functioning correctly, vintage Les Pauls have controls you can use to achieve a huge range of tones without ever touching your amp or a pedal. Check out archive footage of Paul Kossoff or any number of Joe Bonamassa instructional videos and you'll get the idea.

Bonamassa explicitly states: "What people don't realise about old Gibsons is a significant part of the sound is not in the pickups, but in the pots." He attributes a "nice clean, clear open sound" to the smooth taper of vintage pots working with lower output pickups and military-grade wire and capacitors.

You can buy vintage 500k Centralab pots on Reverb and so forth, but they tend to be highly priced and there's no guarantee that they'll be working properly. Most suppliers stock 500k replacement pots for Gibsons, but what's the best option if you want to get close to vintage spec without buying vintage?

To find out, we're measuring a selection of popular replacement potentiometers. This involves taking the actual value of the potentiometers and then plotting their tapers on graph paper based on resistance readings taken at 10 intervals corresponding to the markings on a Les Paul control knob.

For comparison purposes, readings are taken from all four potentiometers in the 1954 Goldtop we've borrowed for this feature. The actual resistance values vary from a low of 462k to a high of 600k with an average of 537.5k. All four vintage pots also read between 1k and 2k with the control knobs set to one and they are all logarithmic rather than linear.

We average out the readings from the four vintage pots and draw a response curve (see p65). A graph is also drawn for each replacement potentiometers, so they can be individually placed over the vintage potentiometer graph to provide a visual indication of how closely the resistance readings and tapers match.

SMOKIN' POTS

CTS Audio – this is the most commonly used replacement potentiometer and it's fitted in many high-end guitars. The actual resistance value is 508k and resistance remains significantly lower until five, whereupon it conforms to the vintage curve until three before drifting lower. If you're looking for vintage response, this potentiometer is possibly the least-authentic choice.

Alpha 500k – considering it's a cheaper option, the Alpha pot does a lot better than the CTS Audio. It still shows some resistance at one and although resistance drifts very slightly above and below the vintage average, the taper shape actually conforms closely to the vintage taper. The actual resistance is 488k, which is higher than the lowest vintage pot reading, and it has a nice smooth feel.

OPPOSITE Our three test-bed guitars – a Gibson Custom Collector's Choice #26 Whitford Burst, our work-in-progress Greco conversion and a 1954 Goldtop

POT RESISTANCE VALUES

	1	2	3	4	5	6	7	8	9	10
BOURNS SHORT	0k	14k	24k	36k	46k	140k	253k	365k	480k	480k
BOURNS LONG	6k	17k	28k	39k	49k	148k	276k	406k	533k	542k
BARE KNUCKLE 1	0k	10k	24k	35k	49k	74k	163k	328k	490k	533k
BARE KNUCKLE 2	0k	9k	24k	40k	54k	81k	155k	304k	466k	509k
ALPHA	4k	12k	19k	38k	55k	73k	207k	334k	460k	488k
CTS AUDIO	0k	4k	17k	29k	43k	59k	98k	257k	423k	508k
CTS VINTAGE	0k	17k	33k	49k	66k	96k	168k	303k	431k	488k
'54 LP V1	1k	10k	26k	38k	50k	78k	172k	305k	460k	493k
'54 LP V2	1k	7k	20k	33k	45k	64k	154k	300k	497k	600k
'54 LP T1	1k	9k	23k	34k	45k	83k	208k	366k	545k	595k
'54 LP T2	2k	10k	24k	38k	48k	74k	182k	323k	458k	462k
'54 LP AVERAGE	1.25k	9k	23.25k	35.75k	47k	74.25k	179k	325.5k	490k	537.5k

ABOVE TOP The five capacitors – a mix of vintage and NOS models – that we put to the test

ABOVE An Astron/Lafayette cap installed in the Collector's Choice Les Paul

CTS Vintage Taper – this pot certainly gets closer to the vintage average than the regular CTS Audio pot and it's very close from seven to eight and one to four. But the taper is very different between four and seven, where the CTS is noticeably higher in resistance and between eight and 10 where it is lower. Pot resistance is 488k.

Bourns Long Shaft – with an actual value of 540k, this one starts well, but things quickly veer off course. Between 10 and nine, resistance hardly changes, then the taper follows the vintage line, albeit at a higher resistance, until it joins the curve at five and remains quite close from five to one. With its long shaft, this pot might suit Les Pauls with thicker tops and some will like the loose feel.

Bourns Short Shaft – this is fairly similar to the long-shaft version, but there is even less of a resistance change between 10 and nine. From there the resistance decrease is very linear and consistently higher than vintage average, until the lines meet up at five and follow closely to one.

Bare Knuckle CTS 550K – these pots have long shafts and a plus or minus 10 per cent tolerance, which makes them bang on for the vintage range we measured. Testing two of these, we get measurements of 509k and 533k. Comparing the graphs, the 509k pot moves slightly above and below the vintage curve between five and eight, but otherwise stays close. The 533k pot is an almost perfect match for our vintage average from one to 10.

The clear winner is the 533k Bare Knuckle, with the Alpha a very close runner up. If you order a set of Bare Knuckle pots, we'd suggest measuring across the outer lugs to determine the actual resistance values. If you want a bit more brightness, use the higher value pots as volume controls and use the others for tone.

Alpha pots cost around £2 each, so they're a bit of a bargain compared to the £9.95 Bare Knuckles. The closed-back casings will also look more vintage correct, so long as you disguise the markings by soldering the ground wires over the top. However, the shaft is narrower than a CTS, so you may need a couple of wider washers to clamp it in place if you're fitting Alphas in USA-made guitars.

Measuring just 10mm, the short shaft means the Alpha pots we tested should be fine in SGs, Juniors, Vs and so forth, but cannot be installed in some Les Paul-type guitars. Long shaft versions are available from Axesrus, but we can't vouch for the taper at the time of writing.

If you like to use your guitar controls for tone shaping, or think you might enjoy learning to do so, a pot change is recommended. If you have no intention of using your controls below the 10 setting, don't bother changing a thing.

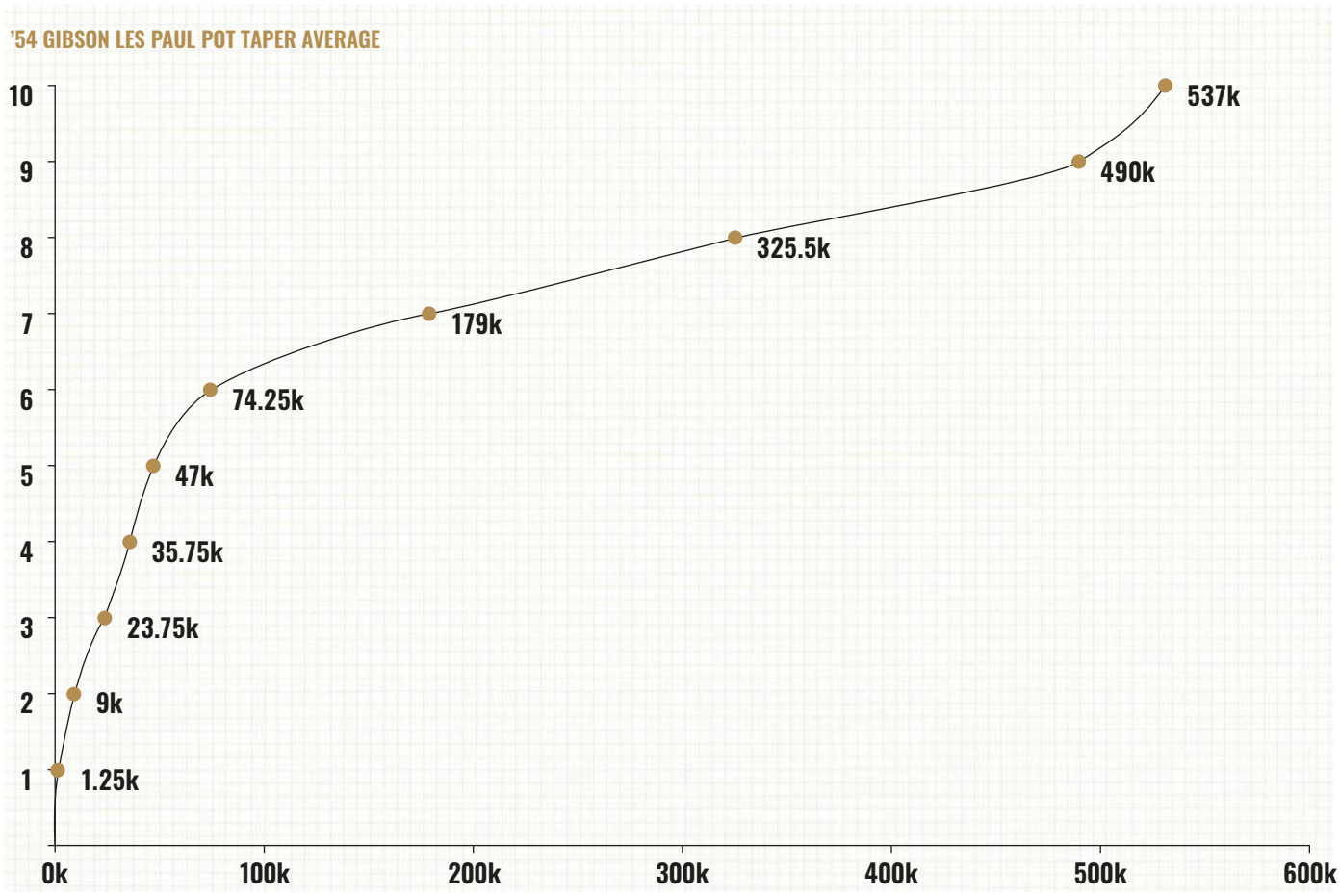
CAPACITORS

Vintage Les Paul enthusiasts can get pretty obsessive about tone capacitors and serious money changes hands for original – and sometimes not so original – 'bumblebees'. These were the Sprague-manufactured capacitors Gibson used during the late 50s.

However not all bumblebees were created equal, and although it's widely assumed they were paper/oil types, the manufacturing process changed and many are more modern-style Mylar capacitors. You can tell the difference because the oil-filled versions have a filler cap protruding from one end with the leadout wire soldered into it. At the other end, the wire goes straight into the capacitor body.

We have no intention of getting into the oil versus Mylar debate, but it is worth pointing out that many of the 'Holy Grail' Bursts left the factory with Mylar capacitors – that's the sound you can hear on countless classic records. The Astron capacitors that Gibson started using in 1960 are lesser known, but we actually encountered them recently in the 1960 Les Paul that started this whole thing off…

Research suggests these are metal-foil capacitors in ceramic tubes. While Burst obsessives are busy chasing bees, you can find old Astrons like the ones in the 1960 LP for less than £10. Sometimes they were branded Lafayette and those tend to be even cheaper. It's worth noting that most old capacitors will have



drifted far away from their stated value. It's safe to assume this is true of many of the caps that have resided undisturbed in vintage Les Pauls for decades, so if a capacitor no longer reads close to vintage spec 0.022uF, it may not matter. In fact, it could actually be beneficial.

While measuring pots is a valid exercise, capacitor choice is more subjective. Instead, we gather a small selection of vintage and NOS capacitors and conduct some blind tests. The capacitors are wired to a rotary switch and hooked up to our Collector's Choice model fitted with Monty's PAF replicas.

During testing, they are identified only by number and we make notes during the testing process.

IF THE CAP FITS

Sprague Hyrel 'Vitamin Q' – this NOS cap is supposedly a paper/oil type and since it's only rated at 200 volts, it's relatively small. We find moderate roll-off quite clear and vocal with a wah-like narrow 'Q' and a hint of vintage quackiness. Things start getting a bit muffled around 4.5 and with the tone control rolled fully back, the lows get woofy. This is a nice-sounding capacitor that measures bang-on 0.022uF, but the tone control's usable range becomes limited with this in the circuit.

Astron/Lafayette No 1 – the multimeter reveals that this cap has drifted from the stated 0.03uF up to 0.084uF. Even so, the guitar retains brightness and with the tone rolled back to halfway, note definition is better than the Hyrel. However, the dynamics feel a bit compressed and with a slight loss of sparkle combined with some graininess in the upper mids, we find that this capacitor obliges you to play harder to sound good.

Astron/Lafayette No 2 – this has drifted even more and reads 0.23uF. Even so, the guitar sounds clear and feels like it has a slightly higher output. There is a quacky wah quality, but the Q is less pronounced than with the Hyrel. We also find the wah effect changes with playing dynamics – becoming more apparent as you play harder. With the tone fully up the guitar is chimey and smooth and when rolled back, low-string definition is retained because the very lowest frequencies are attenuated along with the treble.

Sprague bumblebee – this was advertised as an NOS bumblebee and it appears to be a paper/oil type. As expected, the value has drifted upwards – to

ABOVE Our test set of original 1953 Gibson P-90 pickups

0.036uF in this case. Again, the guitar sounds loud with this cap and there's a nice sparkle in the treble. The downside is a push in the low mids that adds a touch of muddiness, but it's a decent-sounding capacitor that retains detail.

Russian K40n Paper/Oil – these chubby red caps have been long time TGM favourites and it doesn't disappoint here. Reading 0.023uF, words like plummy, rounded, smoky and balanced spring to mind. With the tone on 10, there's sparkle aplenty and when you roll back, you get a sax-like honk that continues to a smooth jazziness. It may not the best choice if you like your Lesters aggressive, but it's a great cap if you prefer a touch of refinement.

It's hard to say which capacitor produces the most authentically vintage results – or indeed if that's the most desirable and usable outcome anyway. The differences don't really jump out and we find it takes a period of careful listening and experimentation to zone in on what each capacitor does.

Even so, we do have a favourite: the 0.23uF Astron/Lafayette – the capacitor that is furthest away from vintage spec. Loaded in the Collector's Choice with a full set of Alpha pots, the volume and tone controls become wildly interactive and when the volume is around five, rolling back the tone introduces a mid scoop that actually enhances clarity. The centre frequency even appears to change slightly depending on the volume and tone settings. So, the tone acts as both a treble roll-off and a rudimentary parametric equalizer – depending on how the controls are set.

If you listen carefully, you can hear this with regular 500k pots and 0.022uF caps, but we suspect an upwards drift in actual cap value might accentuate the effect.

PICKUPS

This is the big one – and if you get the right type of pickups in your Les Paul, it can have a very profound effect. At the very least, your P-90 or PAF replicas will need to have suitable alnico magnets, steel parts with low carbon content, plain enamel magnet wire and no wax potting. In the case of PAF replicas, the coils will be slightly mismatched.

If you can get those bases covered, you may wish to research the tones associated with different grades of alnico and decide whether you want early style P-90s with A3 or late-50s style with A5. Also research the range of DC resistance readings of vintage pickups and consider how that will impact tone.

If you're ordering from a boutique maker, you will no doubt be able to discuss your requirements and allow the experts to guide you. For this feature, we're actually more concerned with getting the best from your pickups rather than identifying the 'best' pickups per se.

An old pro-audio old adage says the best microphone in the world is the one you have. What it means is that so long as a mic is of a certain standard, great results can be achieved by applying technique and ingenuity.

If the sound is too bright, you move the mic to somewhere where the sound is a little darker. If you need more treble you can do the opposite, and you can balance the low frequency content by altering the proximity of the mic to the instrument being recorded. So how does this relate to pickups?

ADJUSTING PAFS

Although the scope for adjustment is physically restricted, adjusting pickups is very much akin to placing microphones. This is particularly true with microphonic vintage-style pickups such as PAFs and P-90s, because they are extremely sensitive to height settings.

There's no point in throwing in endless sets of high-quality pickups in an aimless search for a specific sound. Unless you take the time to zone in on the optimum settings for a particular set, you may never hear the pickups at their best, or discover the full range of tones and textures they're capable of.

The only tools needed are your ears and a screwdriver. With the pickups set low relative to the strings, you get a darker and more mellow tone but

it may lack bite, aggression and output. Moving the pickup closer to the string will increase output and make the tone brighter. Lift it higher still and you'll get more bite and aggression, but the tone can get become too edgy and shouty, plus the pickup's magnetism may dampen string vibration and reduce sustain.

We take our time getting the bridge just right, always shooting for an even string-to-string balance from bass to treble. We follow the same procedure for the neck pickup, but it's slightly complicated by the need to balance the neck to the bridge pickup. You may notice that low strings lose definition if the neck pickup is set too low. When both pickups are perfectly balanced, the middle setting's voice will be noticeably distinct.

We were perfectly happy with this procedure until that 1960 Les Paul came along and opened our eyes to other possibilities. We soon noticed the bridge pickup was set far lower than usual, but the pole screws were jacked high above the covers to compensate. The bridge sounded almost like a P-90, combining a thick midrange roar with tremendous clarity and soft treble.

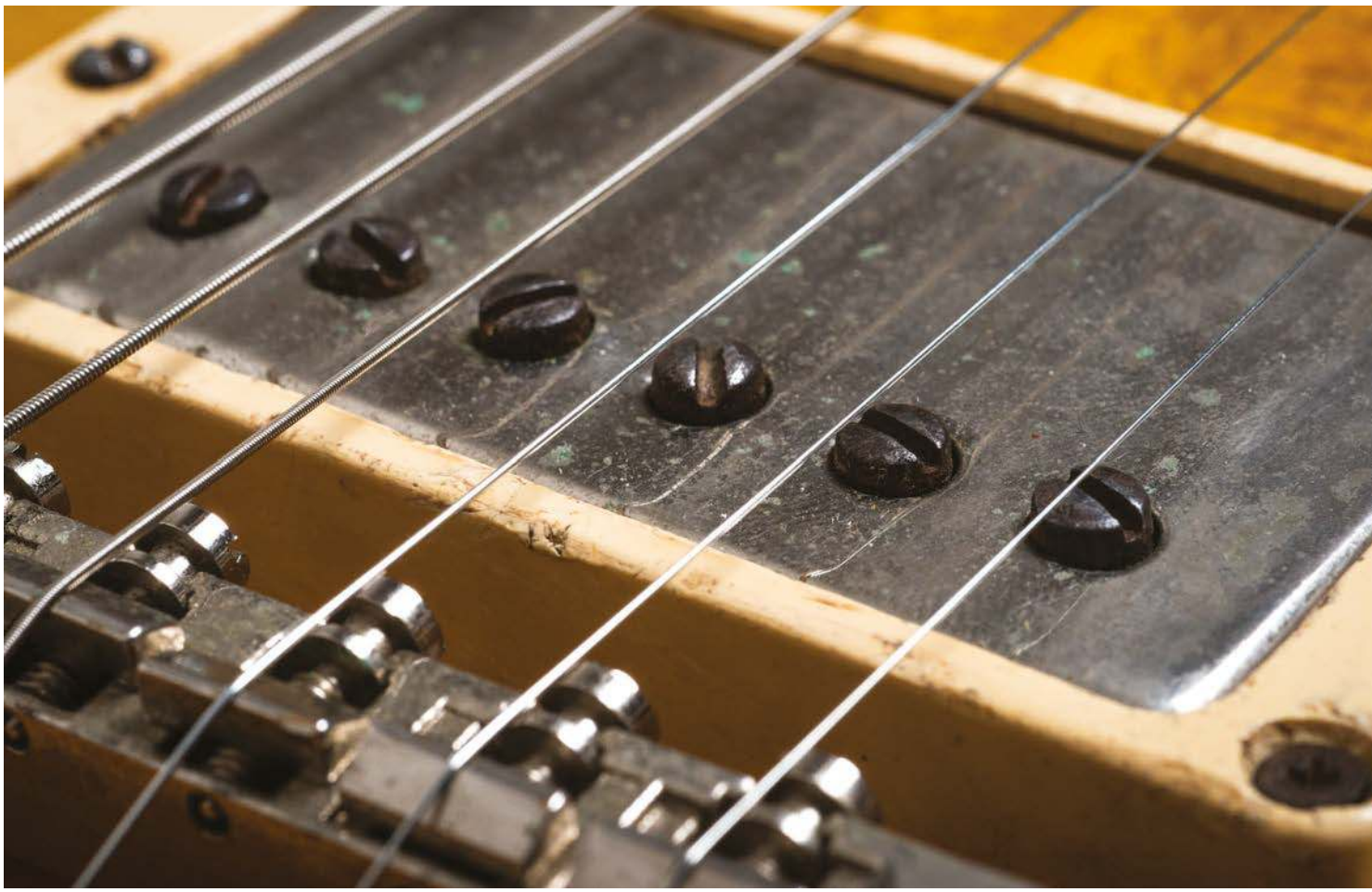
Trying this approach with our own Monty's loaded Greco LP Standard copy, we were astonished to discover how close we could get to the tone. All the action happens in the midrange and once you get the hang of balancing pickup and pole-screw heights, you can shift the midrange tonal characteristic and almost re-voice a pickup to your taste.

By taking the more traditional approach to the neck pickup, you can swing it so the neck is just as bright, or even brighter than the bridge. A fantastic tonal contrast can be achieved, and the middle setting will also now have an audible phasiness with slightly hollow mids for a great third tonal option. And if you don't want to go down that route, contrary to what some people might claim, the pole screws can still be used to even up string-to-string balance.

ADJUSTING P-90S

Attention turns to P-90s and we count ourselves lucky to have a genuine 1953 set to test in our Greco. Cutting to the chase, the Greco conversion with vintage P-90s installed sounds virtually indistinguishable from the bona-fide 1954 Gibson Goldtop. This mirrors our findings when we installed a set of vintage PAFs in a Greco in the past.

The set-up procedures we discussed in relation to PAFs also apply to P-90s; however, adjusting height can be tricky. Some use foam rubber for its springiness, but we prefer wood shims. There is another set-up trick you can try to alter P-90 voicing.

BELOW The Duggie Lock Burst's pickups were set low, but the pole screws were jacked up

ABOVE Our tone tests reveal that, to us at least, the pickups are the most important factor for authentic vintage-style Les Paul sound

OPPOSITE TOP The earliest P-90s, such as the ones on this 1952 Goldtop, had their height-adjustment screws in the corners

OPPOSITE Our Greco singlecut in its finished state, complete with aged gold finish

Years ago, a prominent pickup builder explained to us how the two magnets in P-90s are arranged to repel rather than attract. Over the decades, this can actually cause the magnets to move apart, and this changes the shape of the magnetic field.

It's the simplest mod to try with both vintage and repro pickups. Slacken off the baseplate screws very slightly until the magnets will slide with a little bit of encouragement. Try moving them a millimetre or so at a time and you may hear how the beefy midrange roar begins to take on a vintage quackiness.

You can try this on just one pickup to achieve tonal contrast, or both if you like the effect. It costs nothing and so long as you note the starting points, the magnets can be returned to their original positions.

OLD OR NEW PICKUPS?

If you only take one thing away from reading this article, it should be that dropping genuine vintage pickups into a decent-quality reissue or copy will get you closer to the actual sound of a vintage Les Paul than buying a top-dollar Gibson Custom or custom-built replica instrument that comes equipped with factory-made pickups. Prices for vintage PAFs have skyrocketed and you need to be careful, because some replicas are scarily indistinguishable from real ones and sadly, there are a few dishonest sellers out there. But even if you are prepared to pay around £4,000 for a vintage set, you would still have a grand or so's worth of change to play with before you start getting into the price range of even the cheapest second-hand Collector's Choice Gibsons.

At the time of writing, there were three 1950s P-90s on Reverb for between £330 and £360 each. Granted this isn't cheap compared to even the best replicas, but as a magic-bullet solution for vintage Les Paul tone, a set of vintage P-90s may end up saving you a lot of effort, time and money. You could even buy one at a time as funds allow.

VERDICT

Although a range of factors interact to produce vintage-style Les Paul tone and controllability, our test results suggest some are more influential than others. Everything we have learned so far about vintage Les Pauls leads us to conclude that the pickups are the most important factor and the wood is possibly the least of it.

Of course the wood matters, but so long as your Les Paul has a non-chambered mahogany body with a

solid maple cap, a rosewood fingerboard and a glued in mahogany neck, the fundamentals are in place. We'd probably argue that a long-tenon neck joint and a fully loaded weight of somewhere between 8.2lbs and 10lbs are desirable features, too.

We've reached our conclusion by experimenting. Having had the opportunity to load vintage P-90s and PAFs into a couple of 80s Grecos, there's no denying that copies can sound almost exactly like the real thing.

When vintage Gibson hardware is installed, too, the results are truly staggering. Sadly vintage hardware has become very expensive, but if you can afford a piece here or there, you will hear a difference. In the meantime, we'll continue our investigations in the hope of finding repro hardware with authentically vintage tonal characteristics.

Let's be clear about potentiometers. If you increase the pot's resistance by 10k, or even 100k, you will get a bit of extra brightness. However, it's not a massive change and the most crucial factor is the way they respond. We have established that modern pots with vintage-accurate tapers are available and they are affordable.

Capacitor choice has an even more subtle effect and only those with keen hearing will detect a difference. It's quick and easy to install a bunch of capacitors on a rotary switch to audition them, so simply pick the ones that sound good to you. All the vintage ones will have drifted so far out of spec, it would be misleading if we told you to buy a specific type or value.

The reality is that the majority of us will never be able to afford a genuine 50s Les Paul and it's easy to spend our time gazing wistfully at vintage pictures, reading every article and hanging out on forums. As fun a pursuit as this undoubtedly is, it ultimately doesn't get us any closer to the sound in reality.

Alternatively, you can get proactive about it. We hope we've demonstrated that not having a spare £220K in the bank doesn't disqualify you from enjoying vintage Les Paul tone. Get creative, be prepared to compromise and you may find yourself very pleasantly surprised with the results. ***G***

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Gibson's thinline Electric Spanish guitars have been used to give the world some of the greatest rock, pop and blues guitar tones in the history of hot wax. From Chuck Berry, BB and Freddie King to Clapton and Carlton to Bernard Butler, Noel Gallagher and Dave Grohl, the list of artists who've rocked a Gibson semi is as glittering as it is varied.

Much like the other three members of the 'big four' that have carved out a place on the electric guitar's Mount Rushmore – the Telecaster, Stratocaster and Les Paul – it's hard to imagine popular music as we know it without the soulful stamp of semi-acoustic Gibsons deeply embedded in its grooves.

If you're an ES-335 owner already, we're preaching to the choir. If you aren't? There's a reason that some tonehounds refer to these guitars as 'burst killers'. That creaking sound you can hear? That's your wallet, grimacing at the inevitability that flicking through the following pages will cause gear-lust to strike.

The good news is that you don't have to spend a fortune to sound great. Whether you want to get more from a Gibson or you think hot-rodding your Epiphone will take it to the next level – or even if your thinline semi sports another brand name on its headstock – read on for tone tips, easy mods, upgrades and buying advice to help you along the way. Join us then, as we go through the f-hole…

MAKING HISTORY

Of all the classic guitar designs, only the Stratocaster rivals the ES-335 for tonal versatility – and it was a hit from the off…

It's hard to think of a guitar-based musical genre in which the ES-335 hasn't featured in some way. The variety of sounds on offer resulted from a fusion of design ideas, as Gibson responded to the needs of its mid-1950s customer base.

Applying the company's archtop heritage to the new demand for electric guitars that were more controllable at higher volumes, Gibson's president Ted McCarty "came up with the idea of putting a solid block of maple in an acoustic model. It'd get some of the same tone as a regular solidbody, plus the instrument's hollow wings would vibrate and we'd get a combination of an electric solidbody and a hollowbody."

This principle wasn't a million miles away from Les Paul's Log prototype that Gibson rejected shortly before the United States of America entered World War II. Yet rather than starting with a solid centre-block and adding hollow wings to make the instrument look and feel more like a guitar, McCarty inserted the centre-block into a double-cutaway, 16-inch thinline archtop – it was a natural evolution from the thinline-bodied ES-225, ES-350T and Byrdland that had arrived in 1955 following player requests for guitars that were easier to handle.

In addition to its feedback-reducing properties, the hybrid ES-335 design would deliver an even balance, light overall weight and a comfortable seated playing experience – addressing the concerns of many late-50s Gibson customers, for whom the small and heavy Les Paul Model was still something of a white elephant.

Yet when it entered production in April 1958, the revolutionary ES-335 benefitted from the various technological advances that had recently been applied to the Les Paul, in the shape of new PAF humbucking pickups, a Tune-o-matic bridge and stop tailpiece. Most sources agree that 317 of Gibson's new thinline semis left the factory that year – 267 in sunburst (ES-335TD) and 50 in natural (ES-335TDN), marketed at $267.50 and $282.50 respectively. The upscale ES-345 and ES-355 models were officially introduced in 1959, although 10 ES-355s shipped in late 1958.

Nearly six decades later, 1958 might appear to be the year that King Midas came to work for Gibson's R&D department. In reality, the other big launches that year – the sunburst Les Paul, the Flying V and the Explorer – all crashed and burned by 1961 and had to wait to be rediscovered by new generations of players. Not so the ES-335 –it was an immediate hit and has remained in continuous production.

Numerous variants would be spawned in the decades to come, but early close-cousins the Epiphone Sheraton (1958) and Riviera (1961) have obtained classic status in their own right. Modern entry-level versions have been responsible for many a guitarist's first encounter with an ES-335 type guitar – the Epiphone Dot (street price £349) is still one of the best-value electric guitars and offers huge upgrade potential: turn the page to find out how…

THE REVOLUTIONARY ES-335 BENEFITTED FROM THE VARIOUS TECHNOLOGICAL ADVANCES THAT HAD RECENTLY BEEN APPLIED TO THE LES PAUL

NUTS AND BOLTS

Before you even plug your guitar in – and this goes for any electric, not just thinline semis – you can have a huge influence on your amplified tone simply by ensuring that your guitar is set up to your liking, in tune and intonated properly. It's a good, old-fashioned domino effect: a guitar that is comfortable to play will help you relax and play better and you'll sound better into the bargain, as your playing becomes more confident, fluid and articulate.

Experiment with different string gauges and action heights and find the combination that you like the best. Our preference is a 0.011s on a Gibson as the nominal 24.75-inch scale length allows for easy bends while still offering a little fight. A heavier set will also help with stability if you have a vibrato installed.

For a slinkier feel with a stopbar tailpiece, try 'top wrapping'. Instead of threading the strings through the back of your tailpiece in the traditional manner, thread them in from the front and wrap them back over the top. Billy Gibbons is a fan, and Joe Bonamassa swears that it makes a set of 0.011s feel like a set of 0.0105s. Top-wrapping also allows you to screw the tailpiece right down for maximum resonance without creating a break angle over the saddles that's too steep and risking string failure as a result.

On the subject of stop tailpieces, some vintage tonehounds profess to prefer the sonic properties of lightweight aluminium. Locking units from TonePros are another popular retrofit. 1965 saw the arrival of the trapeze tailpiece on the ES-335 and while they have their detractors, there are those who like the slightly more relaxed feel that comes from the shallower break angle and there are plenty of spooky textures accessible by playing behind the bridge.

The majority of tuning difficulties have very little to do with your machineheads and are likely down to friction at the nut or bridge – you'll often hear a tell-tale 'ping' when tuning if a string is binding in the nut. This can be eased with a lubricant such as Big Bends Nut Sauce or just pencil graphite.

The choice of nut material itself is also worthy of consideration. Unbleached bone is the preferred choice for many luthiers. Aside from benefits to tone, sustain and tuning stability, it's also mildly self-lubricating and porous, so absorbs any additional lube you apply and stays slippery, reducing friction. Most bone used in the guitar industry is a by-product of animal farming – vegetarian and vegan-friendly alternatives include Micarta (a compound of phenolic resins) and Tusq (a man-made alternative to ivory).

PICKUP LINES

What if your ES-335 is playing like a dream but just doesn't cut it plugged in? A pickup change could be in order. Retrofit pickups aren't a silver bullet for all of your tonal ills – you might find that a very good set of pickups throws the shortcomings of your guitar into sharper focus in the same way that a high-quality mic won't disguise imperfections in a vocal performance.

Yet there are plenty of humbuckers that suffer from being rather one-dimensional compared to vintage and vintage-style units. If you feel like your pickups are constricting or strangling your guitar's natural voice then there's never been more choice when it comes to replacements.

Early ES-335s came loaded with PAF humbuckers and the extended high-end, touch-sensitivity and harmonic content offered by a really good set of PAF-style units can be a revelation. Assuming you don't want to drop huge money on vintage Gibson 'buckers, you won't go wrong with Monty's PAFs (montysguitars.com), Tyson Tone Preachers (tysontone.com), Mojo Pickups 'Vintage' PAFs (mojopickups.co.uk), Lollar Low Wind Imperials (lollarguitars.com) or Bare Knuckle's VHII units (bareknucklepickups.co.uk).

Once your Gibson or Epiphone semi is loaded with a killer set of pickups, there's an extraordinary range of tones on offer. Head to youtube.com/theguitarmagazine to see a video of blues-rocker JD Simo demonstrating an array of sounds using his beloved 1962 cherry ES-335.

BE QUIET AND DRIVE

One of the major unintentional upsides of the fact that more and more venues are insisting on whisper-quiet stage levels these days is that it makes low-wattage amplifiers and feedback-prone guitars with unpotted pickups more viable for gigging than they've been in decades. When stacks were king, it was almost impossible for all but the most pampered stadium rockers to make fully hollowbody guitars behave – and even centre-block equipped guitars such as the ES-335 could be problematic in some instances.

Stuffed f-holes are probably less necessary these days, but something that's relatively unexplored is how the resonance frequency of individual speaker types can impact on the onset of feedback. While auditioning speakers recently, we noticed that two ostensibly similar alnico-magnet, 12-inch drivers – the Celestion Blue and the Warehouse Black & Blue – interacted with the guitar very differently.

Feedback happened a lot sooner with the Warehouse speaker, to the extent that our ES-335 started to behave more like an ES-330 and was hard to control. The reason is almost certainly that the resonance frequency of the Warehouse (106.73 Hz) is in the low-midrange danger zone that tends to promote feedback with a semi, while the Celestion's lower 75Hz rating is safely out of harm's way.

As ever, it's about the way your guitar, amp and speaker interact: you might find that a speaker with a higher resonance frequency adds punch to a Telecaster. If feedback is a problem, trying swapping your speaker for a driver with a lower resonance-frequency rating before giving up on your guitar or amp.

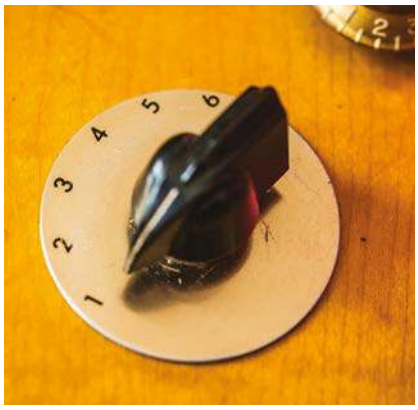
SADDLE SORE

The Tune-o-matic bridge was another slice of Ted McCarty genius; it debuted on the Super 400 in 1953 before finding its way onto the Les Paul Custom the following year. In its first ABR-1 incarnation, the saddles were nickel-plated brass.

In an effort to minimise rattle and vibrations, Gibson was using nylon saddles on several models by the mid 1960s. These days, you can easily swap your saddles for a different material – it's an affordable mod that can have a dramatic effect.

Graphite and Tusq have their fans – the former is claimed to reduce string breakages and the latter offers bone-like sustain and harmonics. Reducing friction is always a good idea when using a Bigsby and nylon saddles work particularly well for that.

They also have a softer attack and sweeter high-end than brass or steel and sounds a little more 'vintage' to our ears. Some players – Joe Bonamassa included – have tried metal saddles for the wound strings and nylon for the plain strings.



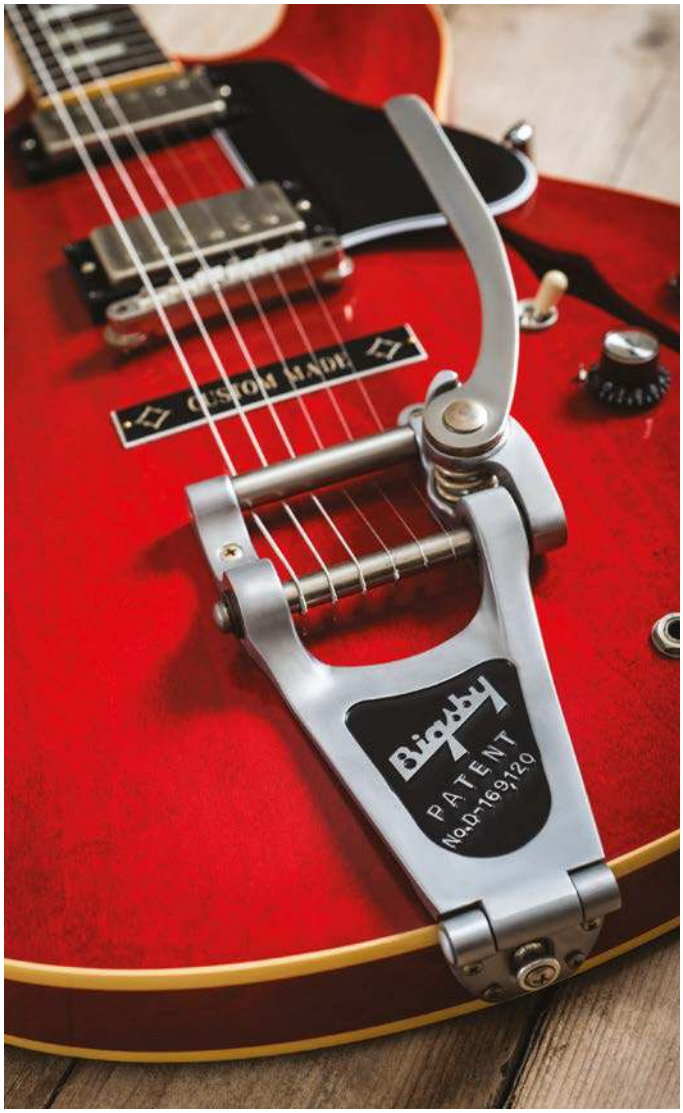
WHAT THE HELL IS A VARITONE, ANYWAY?

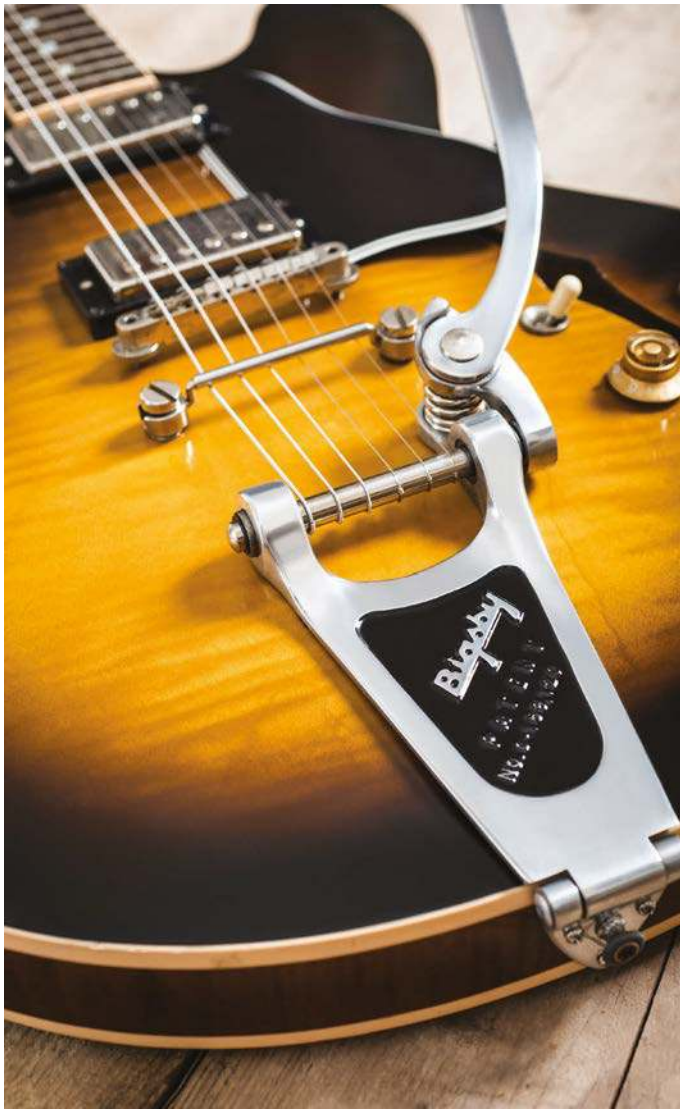
Gibson's original ES-345 and ES-355 models came equipped with a six-position rotary switch called a Varitone. If you've ever searched online for an explanation of what a Varitone does and how it works then we'd wager the phrase 'tone suck' appeared – the Varitone seems to be one of those subjects that people get worked up about on guitar forums. Kings Freddie and BB seemed to put their Varitones to pretty good use, but on the other hand, there's a 14-year-old in Idaho who says that you should rip that tone-sucking POS out of your guitar now. Who to believe?

In simple terms, unlike the passive tone controls elsewhere on your guitar, the Varitone doesn't act as a low-pass filter, it's effectively a notch filter that takes preset slices out of the midrange, resulting in a selection of tones that are increasingly more nasal. A 1.5H choke is housed beneath the treble pickup and it fixes the range of the notch. The first position on the switch is the bypass, while positions 2-6 traditionally cycle through 1,000pF, 3,000pF, 0.01µF, 0.03µF, and 0.22µF capacitors. Each cap is paired with a 10M resistor to avoid pops when switching.

The bypass setting itself is the cause of much consternation as many ES-345 and 355 owners have argued that their guitars sound better with the Varitone removed altogether, but from an electronic standpoint the difference in frequency response is negligible – in an A/B test the contrast between the sound of your regular tone pot set wide open and the sound of the tone potentiometer removed from the circuit altogether would be considerably more pronounced.

Of course, not all Varitones were created equal. Over the years, changes to the recipe have resulted in bypass modes being less than transparent. Issues caused by summing out of phase pickups to mono with a stereo ES-345 or 355 model can also muddy the waters but there's no doubt that the original Varitone circuit does offer some intriguing tones for funky chords and expressive lead lines that go way beyond the regular ES-335 palette – let your ears decide!





HARDWARE STORE

We're Bigsby fans, and as long as it's been correctly lined up during the installation process (see p62) and your bridge and nut slots are well lubricated, a set of strings that have been properly stretched in should offer relatively trouble-free tuning.

Fitting a Bigsby it's a straightforward enough mod, but the model you choose will likely depend upon how squeamish you are about drilling holes in your guitar's top. We'd always recommend going for the USA-made, sandcast aluminium version.

WHICH BIGSBY YOU CHOOSE TO FIT WILL LIKELY DEPEND UPON HOW SQUEAMISH YOU ARE ABOUT DRILLING HOLES IN YOUR GUITAR'S TOP

A Bigsby B7 looks the part on an ES-335 from a vintage perspective and features an integrated tension bar – this creates enough of a break angle over the bridge to stop strings leaping out of their saddles – but the unit is screwed directly into the top as well as through the end-pin hinge plate. Four small end-pin screw holes aren't too obtrusive but the same can't be said for the two-hole 'snakebite' left behind by a B7 on the guitar's top if you remove it.

If you've fitted a B7 to a guitar that previously had a stop-tailpiece rather than a trapeze, you might want to cover up the stopbar stud holes. Aside from asking a luthier to fill the holes permanently, options include a reproduction of the 'Custom Made' plaques used by Gibson (visit philadelphialuthiertools.com and they'll engrave one with whatever wording you like for $22.99) or, if you fancy going down the DIY route, we've seen round-head bolts, pearl and nylon studs and various other items used to cap off the holes.

Also, an ES-335's ground wire is usually connected to one of the stoptail stud bushings – with the stopbar tailpiece removed, the ground wire will need to be relocated. Gibson's factory solution for ES-335s with Bigsbys was to route the ground wire through a small hole near the rear strap button, then screw the Bigsby's hinge plate down on top of the exposed wire. You can drill through the rear wall of the bridge pickup cavity into the treble-side post hole for the Tune-o-matic bridge and send the ground wire through the drilled hole, anchored by the bridge post at one end and soldered to the bridge pickup's braided wire shielding at the other.

If all of that sounds like a pain in the tailpiece, you have other options. A Bigsby B3 or B6 doesn't have a tension bar, so you don't need to drill into the arched top of your beloved instrument. However, neither option creates much downward pressure on the bridge due to there being a very shallow break angle across the saddles. What's more, the stopbar is still redundant, so you'll need to think about grounding. So far, this doesn't sound easier but with the addition of a Towner Down Tension Bar (townerusa.com) you can create a stopbar-like break angle over the bridge

but still get smooth Bigsby performance. And you won't need to relocate the ground wire either, as the Towner hooks onto your existing tailpiece studs, which you can adjust to taste.

If you can find one, we'd recommend tracking down a Bigsby B6CB – it's a Gretsch part with a huge advantage over the regular B6. Rather than a channel for the strap button to sit in, there's a central hole in the hinge plate through which the screw passes and the strap button sits on top. This makes it less fiddly to secure your strap and makes installing the B6CB with the correct alignment a breeze.

If you want to install a Bigsby B7 on your ES-335 without leaving any trace or having to relocate the ground wire then Vibramate's V7-335 kit (vibramate.com) doesn't require any drilling thanks to its system of mounting plates – it's a great sawdust-free way to audition a Bigsby.

ALRIGHT JACK

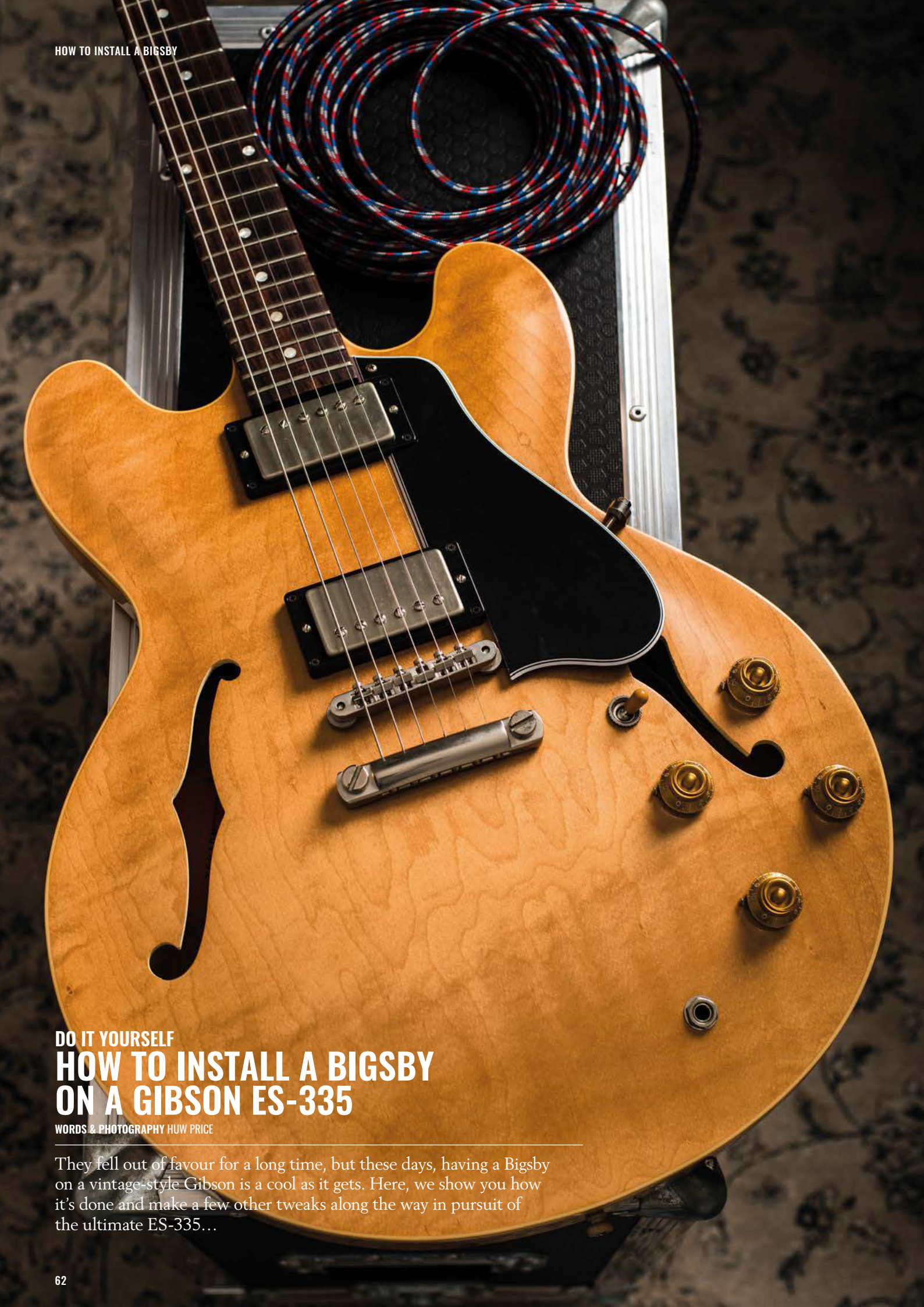
Most Gibson semis have jack sockets on the top of the guitar, behind the controls near the tail. It's unlikely to interfere with most people's playing arc, but we still recommend using a cable with an L-shaped plug.

KNOW YOUR TONE

In order to add depth to your 335's bridge pickup tone while retaining bite, first flip your pickup-selector switch to the middle position. Then roll the neck pickup volume back a couple of notches, stopping at the point at which you hear the bottom end of the neck pickup shelve off. You'll get a thicker version of your bridge pickup tone without any flab.

Vintage Trouble's Nalle Colt is primarily a Les Paul guy, but his advice is transferable for vintage-style ES-335 players: "I ride the volume control a lot, that's my whole thing. Since we started this band I've liked to get kind of a gritty amp and then just turn down to get it to clean up. There's something so nice when you hear that volume go up and it just feels and sounds natural. [For rhythm] I'm usually set about five and a half or six on a Les Paul, in the middle position. Then you can just turn down the bass pickup a little bit – it's amazing. The stuff you can do is incredible, there's a thousand sounds in it if you work at it."

If you're still lacking high-end definition and clarity then a new wiring loom could provide the missing piece of the puzzle. Our own ES-335 has a Mojo Pickups (mojopickups.co.uk) 50s-style wiring harness, with 0.022uf paper-in-oil caps, braided hook-up wires, premium pots and a switchcraft switch and jack socket. Visit bit.ly/dotwiring for a guide to installing a wiring harness in an Epiphone Dot. Happy soldering! G



DO IT YOURSELF

HOW TO INSTALL A BIGSBY ON A GIBSON ES-335

WORDS & PHOTOGRAPHY HUW PRICE

They fell out of favour for a long time, but these days, having a Bigsby on a vintage-style Gibson is a cool as it gets. Here, we show you how it's done and make a few other tweaks along the way in pursuit of the ultimate ES-335…

TOP The strap-button screw will be useful for anchoring the Bigsby while it's being positioned

BELOW To hold the Bigsby in place, a large washer is used between the strap button and the hinge plate

Only relic finishes cause more of a commotion in the online guitar community than the humble Bigsby tailpiece, but converts to the waggle-wand of pure shimmering joy will tell you that these chunks of sandcast aluminium still represent the most expressive and musical vibrato system ever invented for guitarists. Here, I'm taking a recent Gibson Memphis 1958 ES-335 reissue and swapping the stopbar for a Bigsby B7.

There are, of course, several innovative ways to install a Bigsby without making permanent modifications to your guitar, but the prevailing feeling in this office is still that sonically speaking, there's no substitute for screwing that thing directly into the body.

With that commitment made and the guitar in bits on the workbench, it seems sensible to take the opportunity to make some further upgrades – including the pickups. Time to see if an already very good guitar can be made into a great one…

WIGGLE ROOM

It's vital to get a B7 positioned on the centre line, but Bigsby hinges always have a bit of play in them. This means you can fine-tune the position of the front section to ensure that the strings follow as straight a path as possible over the bridge, under the roller and onto the securing pins.

I begin by removing the guitar's stop tailpiece, tailpiece bolts and strap button. With the button removed, masking tape is used to mark the centre of the button's screw hole. This helps to position the Bigsby dead centre and it needs to be held in place.

Although the vintage-style strap button on this reissue model is made from white plastic, it's drilled for a long fixing screw. This is ideal, because it can anchor the Bigsby while I get everything aligned.

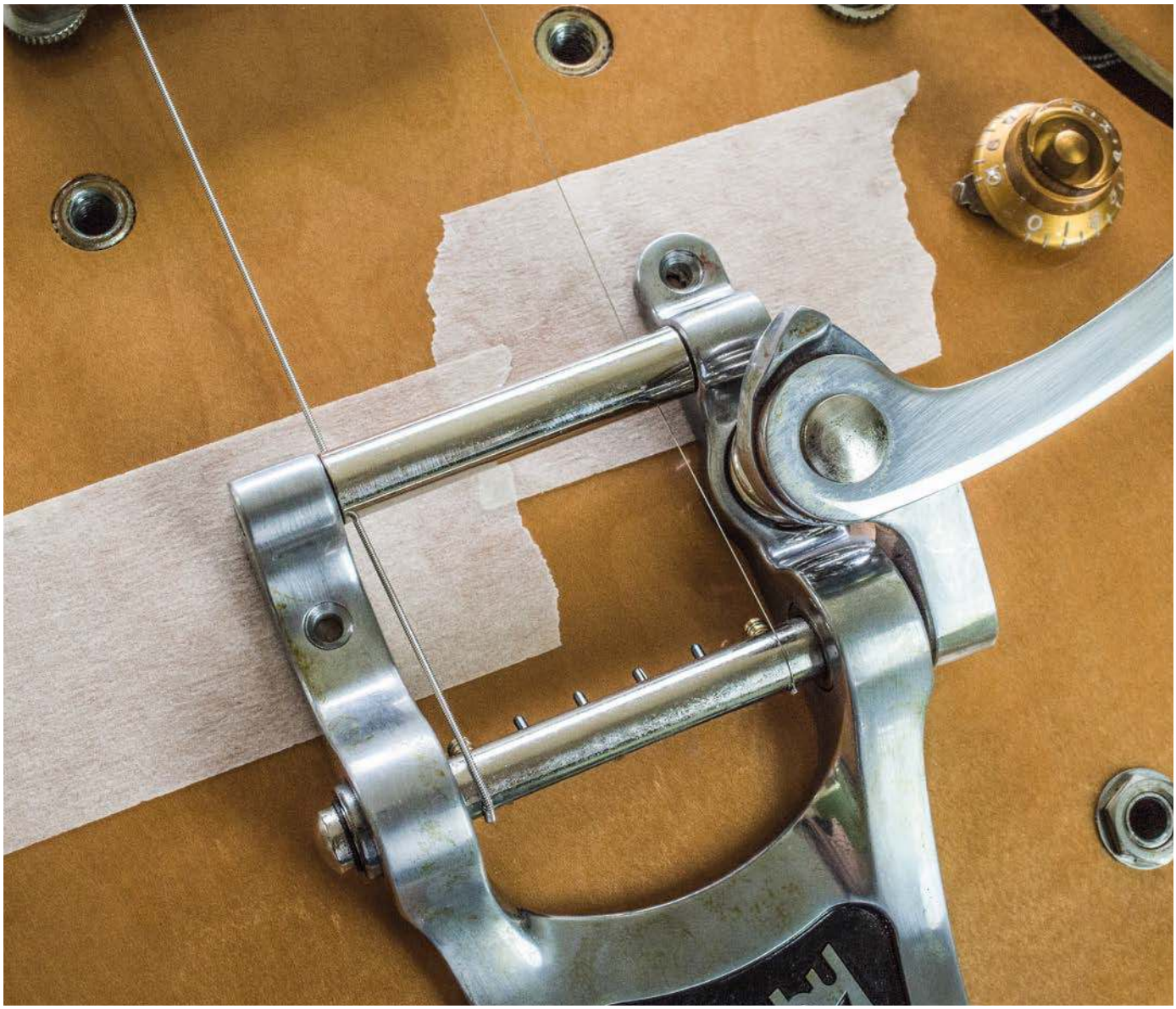
The Bigsby B7 has an opening for a strap button in the hinge plate; I have to use a large washer so the button screw can clamp the Bigsby in place. It probably wouldn't be sufficient under full string tension, but it will do for now.

B7 models are easier to fit than some other Bigsby tailpieces because they're screwed into the top of the guitar. Being fixed in this way means that uneven string tension cannot pull them out of whack: but of course, you do need to be absolutely sure that the position is correct before committing to those screw holes.

To help with alignment of the tailpiece, I fit both the E strings to the guitar and tune them up just enough to eliminate any slackness. Next, a large clamp with cork protection pads is gently tightened, allowing the Bigsby to be adjusted but stay where it's put.

Once I'm convinced that the alignment is as good as it's going to get, I tighten the clamp a little more and drill pilot holes for the four fixing screws at the back and the two on the top.

The screws are put in – for this job, it's important to use a screwdriver that fits the screw heads properly and applying a little wax on the screw threads can help to ease the process.



ABOVE The E strings are loosely tensioned to help line up the Bigsby and establish where the screw holes need to go

RIGHT A large clamp with protective cork pads holds the Bigsby firm while the screw-hole positions are marked onto masking tape

ABOVE Pilot holes for the hinge-plate screws are drilled into the side of the body at the tail

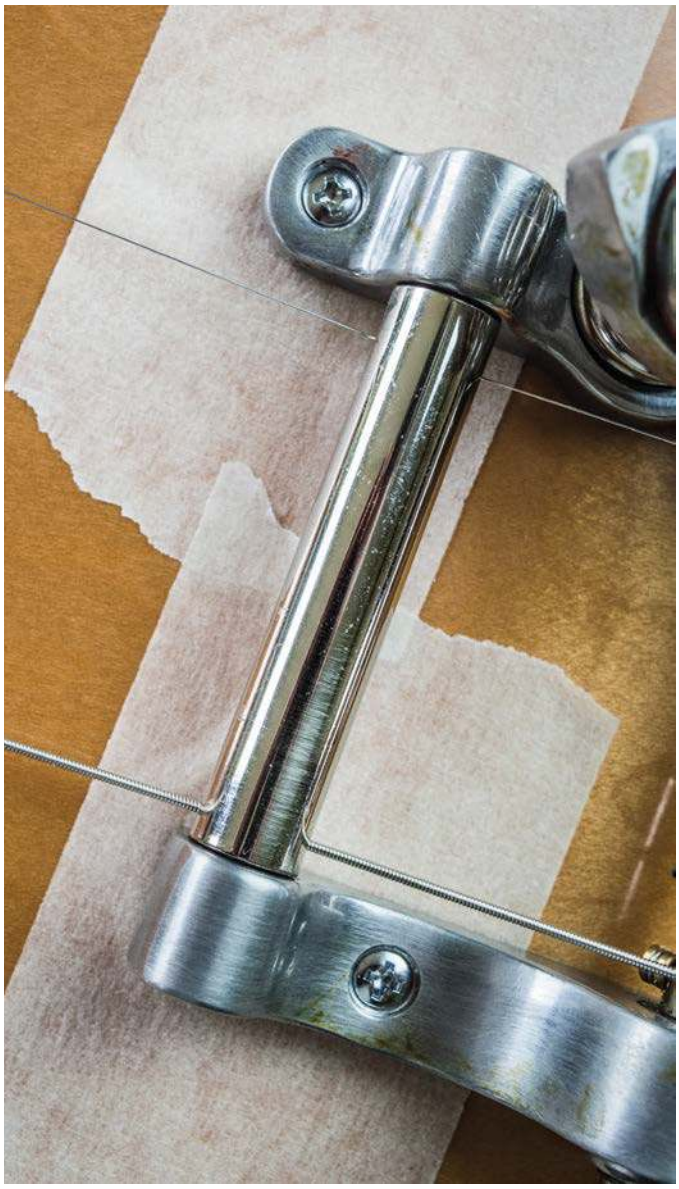
RIGHT The Bigsby screws and button are done – and we'll do the two top screws next

STAYING GROUNDED

Hopefully, it's apparent that fitting a Bigsby isn't a particularly daunting undertaking. There is, however, a complicating factor because without the stop tailpiece, the strings aren't connected to ground and the guitar will generate unwanted noise.

Gibsons with stop tailpieces and wrapover bridges have ground wires in the bushing holes. Although the wire is still in situ, now we've installed the Bigsby, the strings are connected to the tailpiece and don't make contact with the stud bushings. To re-establish a ground connection, I have to run a wire from the Bigsby and I want it to be invisible.

The standard way to do this with semis and semi-solids is to drill a hole through the side of the body at the tail, where it will be hidden by a Bigsby or trapeze tailpiece. With hollowbodies such as ES-330s, Casinos and so forth, you can drill straight through; however, the centre-block complicates things with semi-solids.



To get a ground wire into the body, I have to drill through the side at an angle using a 100mm-long drill bit. It sounds straightforward, but I don't want the drill bit to skate across the glossy lacquer and create an unsightly scratch – even if that'd accelerate the natural relic'ing process…

To prevent this from happening, I drill a pilot hole about 5mm deep using a drill bit with a wider diameter than the bit I'm using for the ground-wire hole. This allows me to get the end of the ground-wire drill bit inside the pilot hole and it prevents the bit from sliding as I get the hole started.

The bit is just long enough and I take care not to press too hard, because I don't want the drill's chuck to hit the guitar when the bit breaks through the side of the block.

A length of black, cloth-covered braided wire is prepared by stripping of a few centimetres at the end and tinning the exposed wire with solder.

Few soldering irons are powerful enough to solder onto a Bigsby, but simply screwing the hinge plate tight against the wire provides more than adequate contact. The other end of the ground wire can be soldered onto one of the braided pickups wires or a pot casing, and everything will work as before.

PECULIAR CUSTOMS

Up until 1965, ES-335s had stop tailpieces and the bodies came off the production line with bushing holes. Clearly, the bushings weren't required if a Bigsby was being fitted and something had to be done about the two holes. When Gibson installed Bigsbys to factory guitars, they were considered custom orders and plastic covers were made to conceal the bushing holes.

These covers were engraved with 'Custom Made' and a star motif at each end. Leaving the bushings in situ beneath the cover allowed owners to change their minds about the Bigsby and revert back to a stop tailpiece – something many did as Bigsbys fell out of favour.

Replica 'Custom Made' plates that look the part are few and far between, but Peter Wilson Guitars on Reverb.com makes pristine and aged versions that are about the best we've seen.

The nicely relic'd plate arrived with adhesive backing for fixing to the guitar – I've never found applying stickers to nitro finishes works out well in the long term, but since some of these cover plates were originally fitted with metal pins, they would look vintage-correct on this guitar.

I'm disinclined to make unnecessary holes in the guitar's top, so instead I'm trying something I've seen on other Bigsby-loaded Gibsons. The trick is to wedge wooden dowels into the bushings and tap the pins for the 'Custom Made' plate into the dowels. In this case, 7mm dowels are the best fit, holding tight enough, but still easy to pull out. I simply push the dowels in and mark the top of the bushings with a pencil. The dowels are removed, cut to the required length and then pushed back into the bushings.

To get everything lined up, I use one of the finest, most versatile and indispensable

OPPOSITE LEFT With two screws in the top, there's no going back now

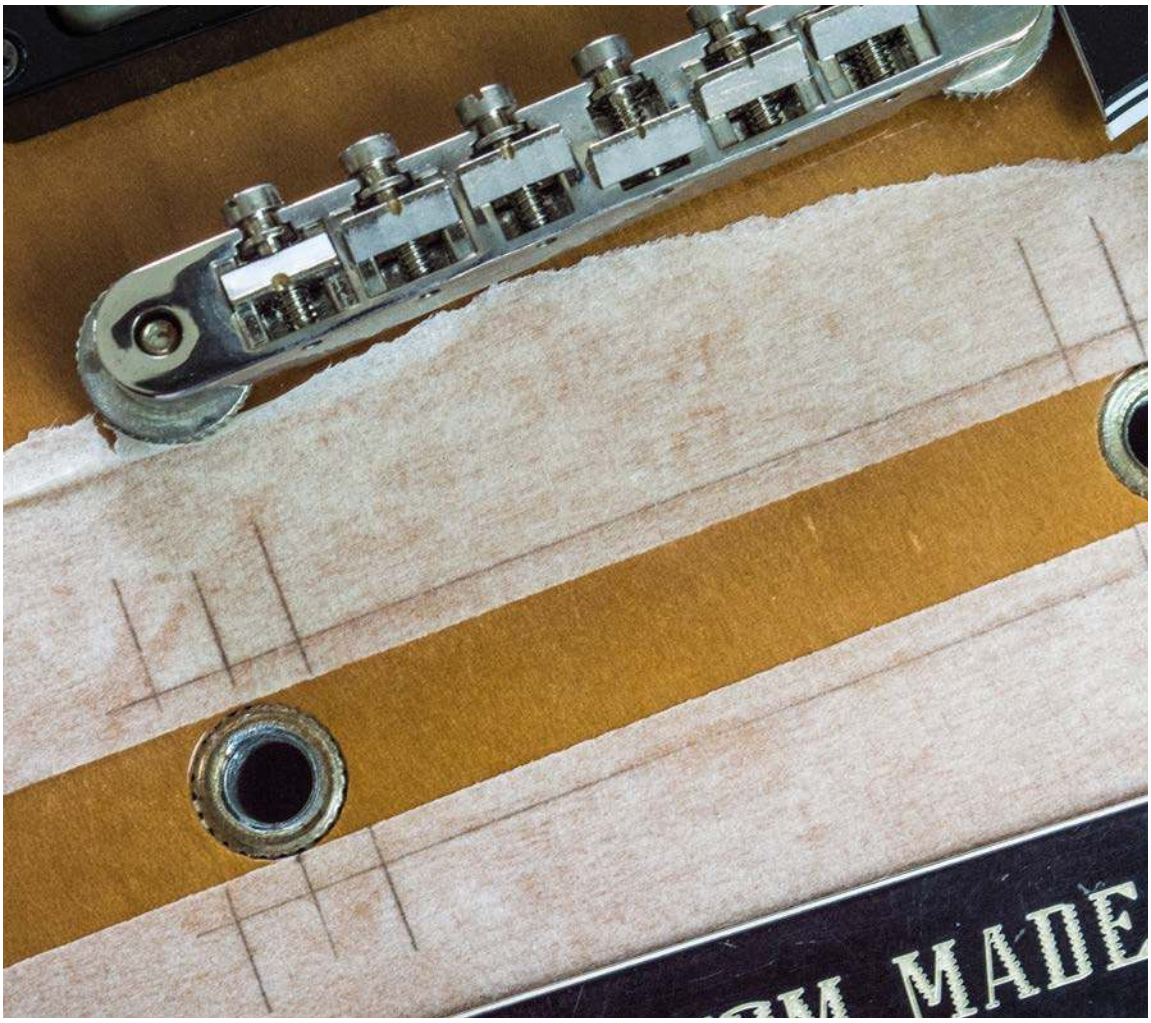
OPPOSITE RIGHT TOP The Bigsby can be removed to drill the channel for the ground wire

OPPOSITE RIGHT BOTTOM The ground wire pushes through the centre-block and into the body. The exposed metal contacts the hinge plate

RIGHT Masking tape allows us to mark out the exact position for the bushing cover plate

BELOW LEFT Lengths of 7mm-diameter dowel are pushed into the bushing holes

BELOW RIGHT Getting everything lined up properly allows us to fix the cover plate using escutcheon pins tapped into the dowels



tools available to luthiers – a roll of masking tape. Generally speaking, I prefer the low-tack variety and you can use it for protecting paintwork, clamping binding, retrieving lost parts through f-holes, marking out and plenty more besides.

By establishing the exact positions of the dowels, I'm able to drill through the cover plate in the centre of the star motifs. The plate is then held in position by masking tape as I gently tap in a brass escutcheon pin at each end. It's probably an affectation, but I drilled the holes through the cover plate by eye so they'd end up very slightly off-centre – simply because that's the way vintage ones always appear.

COVER VERSIONS

No guitar revamp would be complete without a pickup upgrade and the pickups of choice here are a second-hand set of Monty's PAFs. Some people are highly attuned to the look of PAF replica covers and although the original Monty's covers have a nice patina, the guitar's owner has managed to source some covers from German pickup makers Amber with the look he prefers – complete with vintage corners and radiuses, and even tiny punch recesses around the screw holes. Here's how I swap PAF covers…

The pickup covers are fixed onto the baseplates by two blobs of solder. Rather than attempt to desolder the covers, it's actually easier to slip a very fine saw blade between the cover and the base plate and then saw through the joint. Be patient, keep the saw square and angle it so the blade

OPPOSITE TOP The replacement cover is clamped tightly onto the pickup and new solder joints are made to hold it

OPPOSITE MIDDLE A thin-bladed veneer saw cuts through the solder joints and allows the Monty's PAFs to be removed from their covers

OPPOSITE BOTTOM Screw connectors are used to get around the problem of short pickup lead-out wires and they should be placed on the opposite side to the pole screws

OPPOSITE RIGHT The Monty's cover is on the top and the more vintage-correct cover is on the bottom

RIGHT The 335, post makeover – improved looks, playability, tone and sustain

doesn't cut into the edges of the cover or go too deep inside and damage the bobbins or coils. The covers may need to be lightly clamped to hold them steady while you're sawing. But don't clamp the areas adjacent to the joints, or you may find it impossible to get your saw blade between the cover and the baseplate.

Having broken through the solder joints, the covers lift off fairly easily. The new covers are pushed on and I clamp them tight ready to be soldered on. I also discover that it's better for the pickups to be placed upright and on their sides rather than flat, while soldering the joints.

Gravity is your friend and the molten solder will flow where it's needed rather than pool up on the baseplate. After a quick resistance check with a multimeter to ensure I haven't broken the pickups, they're ready to be installed.

SWAP STOP

Here's where we hit our first and only snag – on this guitar, Gibson Memphis faithfully recreated the earlier ES-335 construction style with no wiring-loom access hole in the side of the bridge-pickup rout.
The entire loom went in through the f-hole at the factory, but after an hour or so of trying, I'll concede it's going to take a better luthier than me to get the damn thing back out again.

Besides which, the second-hand Monty's PAFs came out of a Les Paul and since the wires were cut accordingly, they are too short to reach the volume controls anyway. Instead, I decide to de-solder the existing pickup wires while working through the f-holes and run fresh wires from the volume pots to the pickup cavities.

I then install an electrical screw terminal in each pickup hole to create solderless connections for the pickups.

This means they won't need to be sent back for new lead-out wires to be attached and swapping them out to try different pickups in future will be quick and easy.

GETTING A HANDLE

No doubt many ES-335 owners have considered having a Bigsby conversion, but may have shied away due to concerns about it adversely affecting tone. Having previously tried a stock trapeze tailpiece on my own ES-330 – just out of curiosity – I quickly reverted to the Bigsby for the extra midrange weight and sustain it provides.

Clearly a stop tailpiece semi-solid is a very different proposition, but not so long ago, I fitted a vintage Bigsby B7 to a 1964 ES-335. Now before any of you begin rattling off outraged emails, I should point out that the guitar in question left the factory with a Vibrola – a device that adds a lot of unnecessary weight, feels somewhat unnatural to use and generally results in tuning chaos.

The owner had removed the Vibrola and even sourced a vintage aluminium tailpiece. Although the guitar sounded fantastic, he couldn't live with all the holes in the top and decided a B7 would improve the look. Neither of us expected it to improve the tone too, but that's exactly what happened. And it's the same story with this guitar.

In a nutshell, the B7 somehow manages to enhance the 'semi' without detracting from the 'solid' character of an ES-335. To my ears, the tone is freed up and more dynamic. Sustain was impressive to start with, but it's even better with the Bigsby, and there now appears to be an extra degree of woodiness and harmonic complexity. Granted, Bigsbys aren't for everybody, but tone suckers they emphatically are not.

Of course, none of this matters unless the pickups are capable of capturing the enhanced acoustic qualities. Monty's are among our favourite PAF replicas, and they perform exactly as expected. Their naturally bright, clear and detailed character suits this guitar perfectly and no doubt this revamped ES-335 will be seeing action very soon indeed. G

THE ULTIMATE GUIDE TO STRAT TONE

From Hank and Buddy through to Jimi, Clapton, Gilmour, Knopfler, SRV and beyond, the Fender Stratocaster has been at the heart of popular music for more than six decades. Despite its familiarity, its charms are still the source of mystery and wonder to many guitarists today. Whether you're shopping for your first Strat or looking to breathe new life into an old favourite, when it comes to killer Strat tone, we have the answers. It's time to turn on, tune in and rock out…

WORDS HUW PRICE

When we think about improving our tone it's just too easy to focus on the micro and ignore the macro. Although it must be said, buying electronic components, lumps of metal and so forth is a lot less exciting than waiting six months for a set of boutique pickups recommended by some random forum dude to arrive from the frozen wastes of Alaska. Nevertheless, in this tone quest, addressing the system as a whole is more likely to produce the desired results than a potentially dispiriting and financially ruinous cycle of smaller upgrades. This principle applies to all guitars, but none more so than the Stratocaster.

So we're going to provide you with what amounts to a holistic approach to Stratocaster tone optimisation. The topic is approached in the order we believe each job should be addressed. Beginning with string choice and setup, we consider hardware and electronics before moving on to pickups. This is based on a firm belief that the starting point for tone is a Strat that is properly set up and sounds good acoustically.

Before we continue, it's worth noting we're going to be assuming you own a traditional stock Stratocaster here, with the usual pickups, controls, hardware, etc. If your Strat has humbuckers, a locking vibrato or other major mods then some of this won't be applicable – but equally, a lot of it will. Let's go!

VOLUME
TONE
TONE

STRING GAUGE

Selecting your strings is crucial, because a Stratocaster should be set up with the actual string gauge that you intend to use. The core diameter and tension of your strings determine how the Strat's spring claw must be set – which in turn carries over to saddle heights, intonation adjustment and truss-rod tension.

A great setup means two things – the guitar will play well and you'll actually be able to play the damn thing for more than five minutes! That may seem like a statement of the obvious, but Stevie Ray Vaughan's reputed predilection for ultra-heavy strings has led plenty of us to ponder the optimum pain-to-tone ratio.

Fat strings can sound fantastic with vintage-style single coils because they solidify and fatten up the tone and provide higher output levels without the dullness of overwound pickups.

But if you're struggling to bend a full tone and your fretting hand cramps up after a few minutes, your guitar may indeed sound great, but you won't.

Remember that SRV detuned a half step, which would've made the 0.012-gauge sets he preferred when his fingers were sore feel more like 0.011s. Also consider the material, because pure nickel sounds warmer than nickel-plated steel and round cores sound more 'vintage' than hex cores. Base your string choice on what sounds good to you, the pitch you prefer to tune to and the gauge you can realistically manage.

KILLER STRAT AMPS

Marshall Super Bass

Any list of great amps for Strats would be incomplete without a big Marshall head. The 100-watt Super Lead might be the obvious choice, but the inherent brightness can render a Strat's bridge pickup a no-go zone. There were relatively few circuit differences between the two when they were first introduced, but the Super Lead evolved over the years, while the Super Bass stayed the same. They work superbly with Strats because they overdrive easily and the absence of bright caps keeps things smooth – allowing you to dime the treble and presence controls without the ice pick top-end. A long-time favourite of Gary Moore and John Frusciante.

ESSENTIAL STRAT EFFECTS

Fuzz

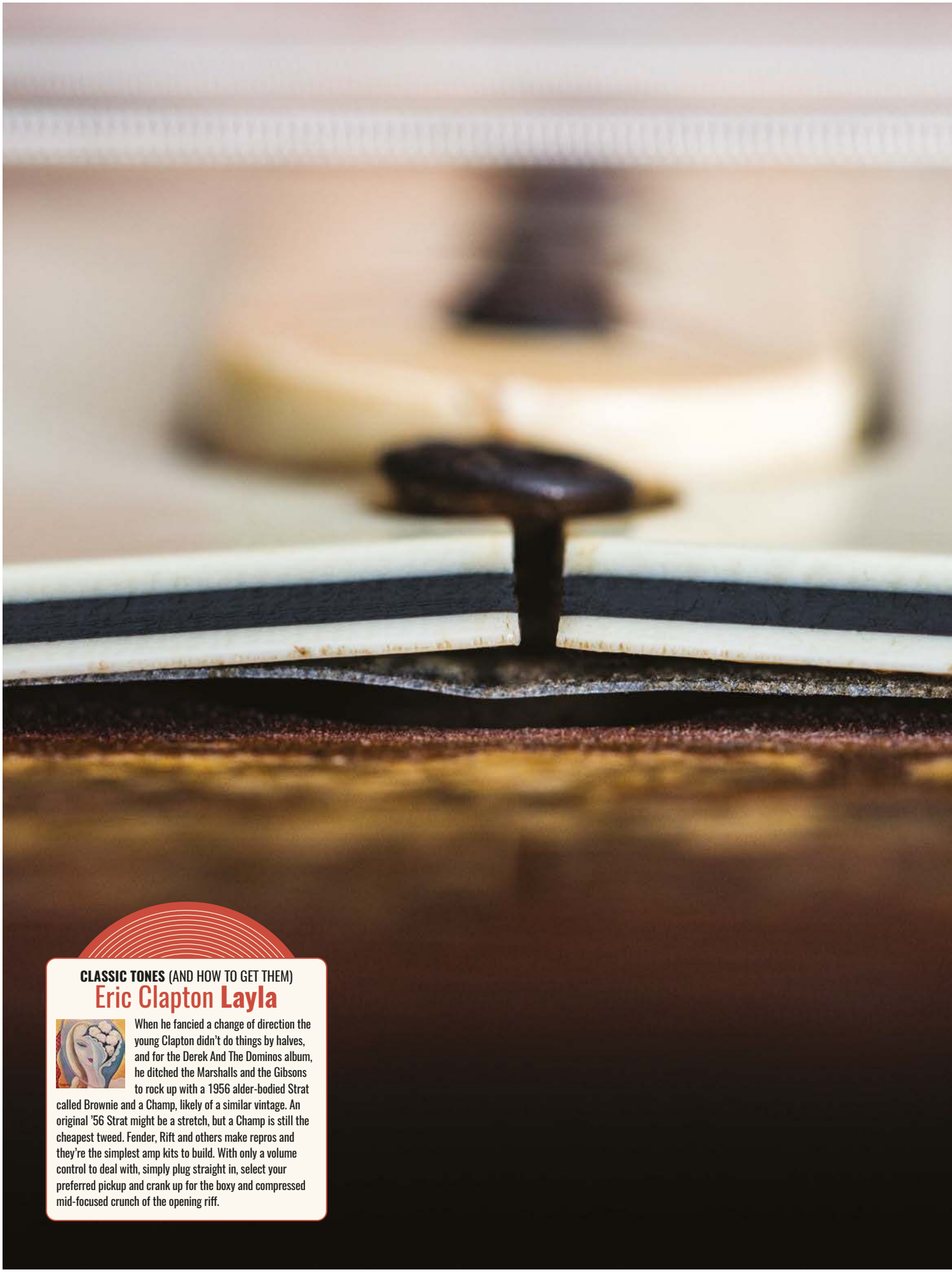
For wrenching more body, sustain and sheer aggression out of a Stratocaster, a fuzz box is a sure thing. However, the effect can vary so much depending on the circuit in question. Fuzz Face circuits with germanium transistors work for early Hendrix tones, but Floyd fans may prefer the later silicon transistor Fuzz Face that David Gilmour used on *The Dark Side Of The Moon*. Later, Gilmour began using various Electro-Harmonix Big Muff pedals for their smoother and more velvety sustain and it's a favourite of alt-rockers, too. Many Strat players use a cranked Fuzz Face with the guitar's volume rolled back to tame the sizzle – it's super touch-sensitive and more articulate that way.

© Getty Images

CLASSIC TONES (AND HOW TO GET THEM)

Jimi Hendrix
Bold As Love

Bold As Love features some stellar examples of Jimi's playing and tones. However, we're going to focus on the psychedelic solo that finishes the track. It's hard to hear everything that's going on because of the heavy effects, but we think it's probably incorrect to say tape flanging was used on Jimi's solo. The swooshing and swelling of stereo image is confined to the drums and the cleaner rhythm-guitar part. Jimi's guitar stays firmly locked on one side of the mix through most of this section; however, there is a modulation effect on the guitar and we think it's almost certainly a Uni-Vibe. Throw in a germanium Fuzz Face and a Marshall, and go crazy.



CLASSIC TONES (AND HOW TO GET THEM)

Eric Clapton **Layla**

When he fancied a change of direction the young Clapton didn't do things by halves, and for the Derek And The Dominos album, he ditched the Marshalls and the Gibsons to rock up with a 1956 alder-bodied Strat called Brownie and a Champ, likely of a similar vintage. An original '56 Strat might be a stretch, but a Champ is still the cheapest tweed. Fender, Rift and others make repros and they're the simplest amp kits to build. With only a volume control to deal with, simply plug straight in, select your preferred pickup and crank up for the boxy and compressed mid-focused crunch of the opening riff.

Aluminium shields such as this can have a notable impact on midrange. Fender used them from the late 1950s until 1967 – this exampe is on a sunburst '64

WIRING

With three pickups, a five-way switch, three control potentiometers and an abundance of space under the pickguard to play with, it's hardly surprising that there are more wiring mods for Strats than any other type of guitar. Here, we're looking at what you can do with a Strat with stock features.

When we consider Strat electronics, one aspect is often overlooked and it plays a subtle yet important function in the vintage tone equation – from the late 1950s until 1967, Fender used a 14-gauge aluminium shield under the pickguard.

Various metals can be used for shielding however the effectiveness of a single layer under a pickguard is questionable. More interesting is the effect aluminium has on Strat tone due to 'paramagnetism'. Fitting an aluminium shield has a clearly audible effect, with rounder mids and a vocal 'ooh' tone for single notes. You can buy a shield for around £10 and they're easy to fit – it doesn't even require any soldering.

The value of the tone capacitor is another often-overlooked feature. Tone controls continue bleeding treble even when they're supposedly turned off. If you need convincing, consider how the bridge pickup of vintage-style Strat sets usually sounds disproportionately bright compared to the middle and neck. It's because stock Strat wiring leaves the bridge pickup unconnected to a tone control. If you ever feel the need to even things up, simply install a jumper wire to allow the bridge and middle pickups to share the same tone control.

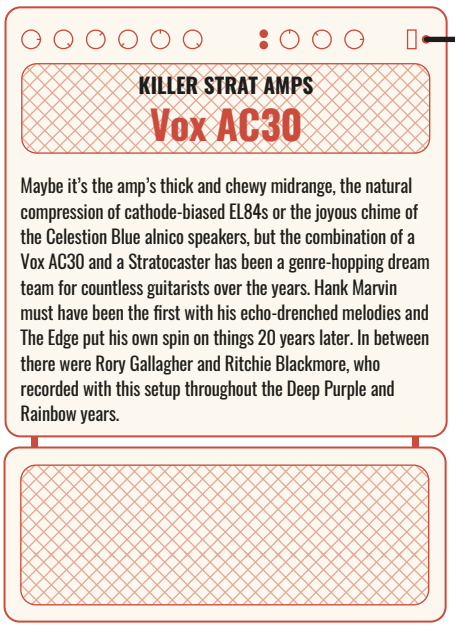
Since tone controls are always in-circuit, it follows that the tone capacitor's value must influence a Strat's treble characteristics. In 1964, the Strat's 10th anniversary coincided with a change in cap value from 0.1uF to 0.047uF. In guitar circuits, there's treble roll-off and a resonance peak at the roll-off frequency. All things being equal, a Strat will sound brighter with a 0.047uF tone cap than it will with a 0.1uF. This is due to the roll-off frequency and resonance peak occurring higher in the audio spectrum.

Until now, we've been considering ways to optimise your guitar, but this is where we move on to modification. So long as you are not buying some fancy relic'd replicas, tone capacitors are cheap and easy to find. You could try paper/oil, ceramic or modern film capacitors to discover which you prefer, and while you may discern some subtle difference in tone and response between the various types, it's the value that's paramount.

If your Strat sounds too bright, try fitting a 0.1uF cap. If you want to brighten things up, go for 0.047uF. If you're using hot-wound pickups and find them too dark, you could even go to a 0.022uF or 0.033uF. Potentiometer values have a big influence on tone, too, because they effect the resonance peak at the cutoff frequency. Large-value control potentiometers make guitars sound brighter by accentuating the resonance peak.

Fender has always used 250k pots in Stratocasters, except for a brief period in 1954 when the very earliest Stratocasters had 100k pots. We've tried these in a 1954 replica and there is a very noticeable sweetening of the treble and a smoother quality to the tone overall. However, you do lose some glassy sheen and shimmer.

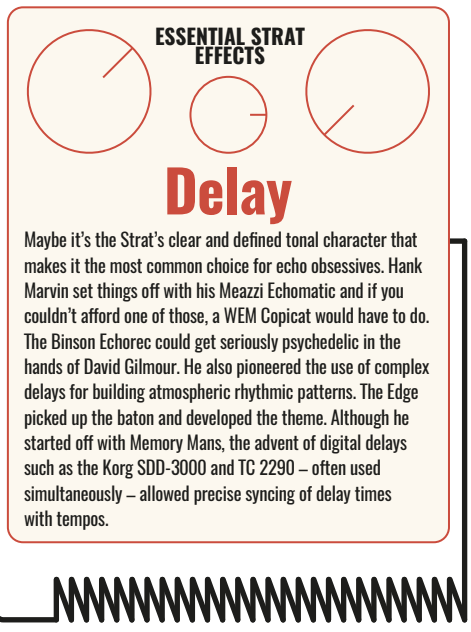
You can darken, brighten, smooth out or add edge to your tone simply by altering component values or fitting a shield. What's more, you can do all three for £15 or so, probably less than a tenth of the cost of that mojo-infused, hand-wound pickup set…



KILLER STRAT AMPS

Vox AC30

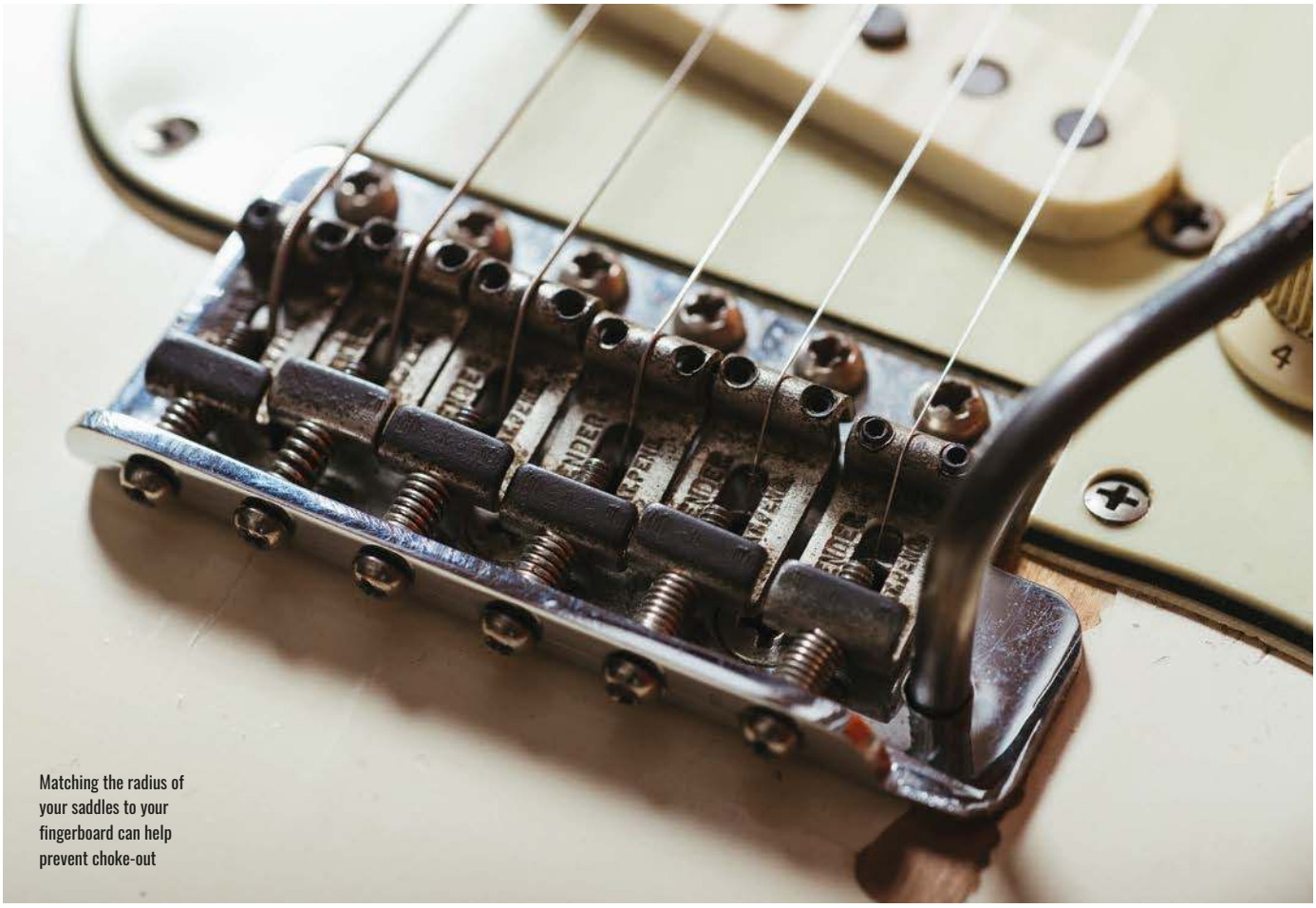
Maybe it's the amp's thick and chewy midrange, the natural compression of cathode-biased EL84s or the joyous chime of the Celestion Blue alnico speakers, but the combination of a Vox AC30 and a Stratocaster has been a genre-hopping dream team for countless guitarists over the years. Hank Marvin must have been the first with his echo-drenched melodies and The Edge put his own spin on things 20 years later. In between there were Rory Gallagher and Ritchie Blackmore, who recorded with this setup throughout the Deep Purple and Rainbow years.



ESSENTIAL STRAT EFFECTS

Delay

Maybe it's the Strat's clear and defined tonal character that makes it the most common choice for echo obsessives. Hank Marvin set things off with his Meazzi Echomatic and if you couldn't afford one of those, a WEM Copicat would have to do. The Binson Echorec could get seriously psychedelic in the hands of David Gilmour. He also pioneered the use of complex delays for building atmospheric rhythmic patterns. The Edge picked up the baton and developed the theme. Although he started off with Memory Mans, the advent of digital delays such as the Korg SDD-3000 and TC 2290 – often used simultaneously – allowed precise syncing of delay times with tempos.



Matching the radius of your saddles to your fingerboard can help prevent choke-out

SETTING UP

The alchemy of setting up a guitar is deserving of a publication all of its own, so we'll restrict ourselves to the aspects that have the most impact on tone – and that starts with the vibrato. It's up to you whether you prefer to block it off, have downward movement only, or float it for up and down pitch shifts: however, what you choose does have some bearing on sonics.

Blocking off a trem by wedging a piece of wood between the block and the back of the spring cavity tends to thicken the midrange and soften the transients for a more compressed tone. Some claim it improves sustain – Clapton is a fan.

In contrast, floating the trem tends to open up the sound and allow the treble harmonics to ring a bit clearer. You may also discern a bit more of the Strat's springy 'internal reverb' and you can enhance this effect by removing the spring cover. For a Strat to sound its best, the strings must be able to ring cleanly and this is achieved through adjustments to the truss-rod tension and saddle heights. Strings vibrate in an arc with minimum displacement near the nut and bridge. If the fingerboard is set too flat, the strings tend to buzz against the frets and a very slight degree of upwards curve (aka neck relief) can prevent this.

Even if you aren't experiencing fret noise, you may notice that the tone becomes warmer and fuller as relief increases. However, the guitar may feel harder to play, so try to find a compromise setting by trusting your ears and your fingers.

Similarly, you have to rely on your ears when you're adjusting the action. Set too low, the strings will choke out against the frets when you bend them, and this is most apparent on the second (B) and first (high E) strings. If you want clean bends and maximum sustain, you have to set the saddle heights so that the strings can be bent without choking out.

The fingerboard radius and, to a lesser extent, the condition of the frets determine how low the action can go. Since modern Fender Strats have 9.5-inch-radius 'boards and vintage spec is 7.25 inches, the unwound strings must be set higher for optimum Strat tone than they might be on guitars with a flatter radius. Struggling with higher action? Try lighter strings.

KILLER STRAT AMPS

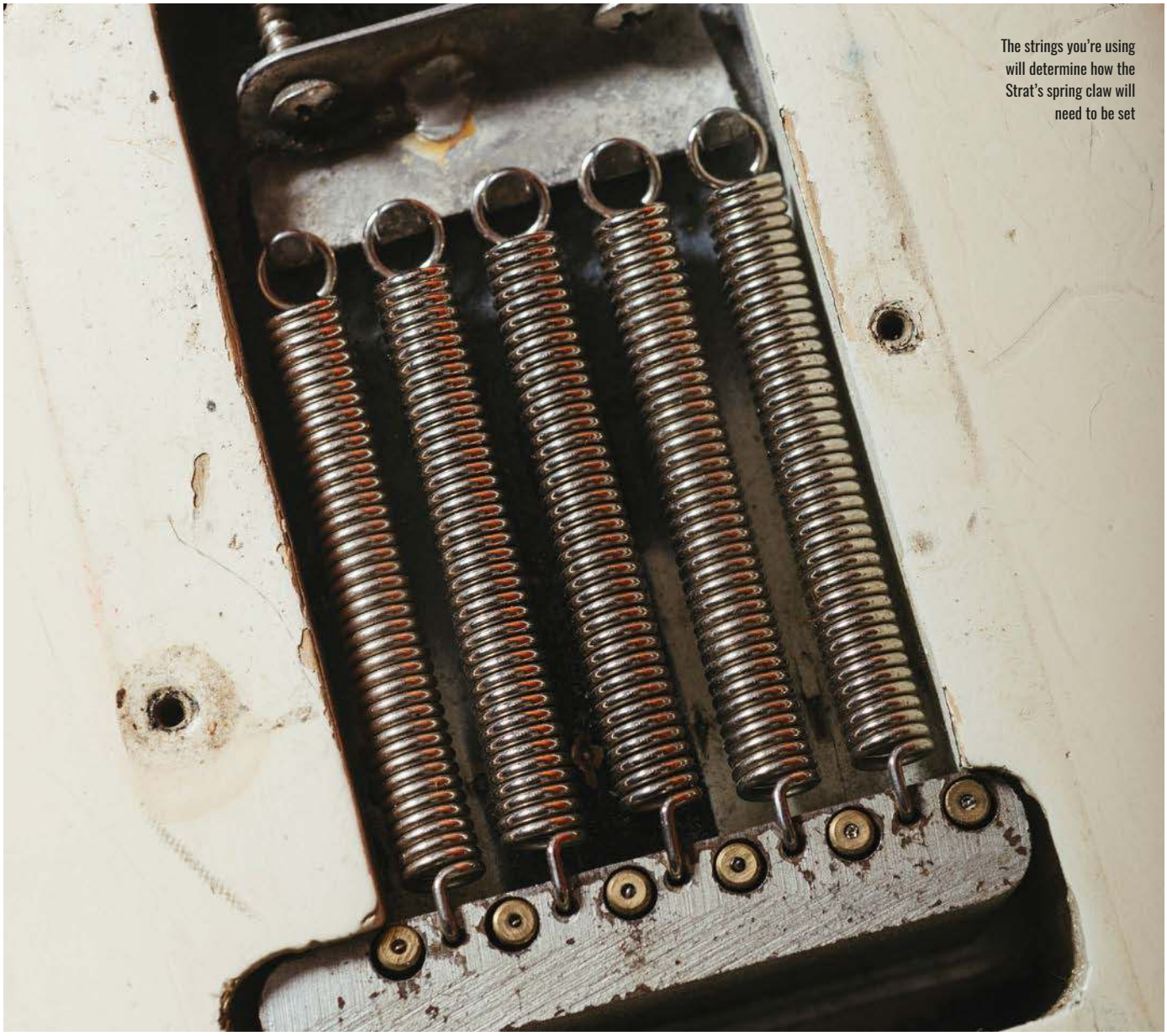
Dumble Steel String Singer

Few of us will ever get the chance to play one of these, and the 12 or so existing examples are destined to spend eternity circulating through the hands of wealthy collectors and celebrity players such as Joe Bonamassa, Eric Johnson and John Mayer. This is among the most fabled of amps because it's the one SRV used to record most of *Texas Flood* in Jackson Browne's studio. It's thought to have belonged to Browne's guitarist, David Lindley. Primarily designed for clean headroom, clarity and high volume, these amps compress and overdrive very nicely, too. Clones are available from Two-Rock, Ceriatone, Sebago Sound and Amplified Nation.

ESSENTIAL STRAT EFFECTS

Overdrive/Boost

Most Strat pickups have relatively low output, so they may need a little help to achieve the required amount of overdrive. The Ibanez Tube Screamer circuit has long set the standard because it bolsters the midrange and rolls off the top end to keep treble sweet. Most modern overdrive pedals offer some variation on the Tube Screamer circuit, but also check out the Boss OD models and Yngwie Malmsteen's favourite DOD 250. Long before pedal overdrive, players used boost pedals such as the Dallas Rangemaster and the Hornby Skewes to force amps into overdrive. Modern boosts with Klon-type circuits offer higher fidelity, improved playing dynamics and subtle shades of drive.



The strings you're using will determine how the Strat's spring claw will need to be set

HARDWARE

With Strat hardware, there are three areas of interest – the vibrato block, saddles and springs. It's odd how some guitars seem to sound best with lightweight aluminium hardware, while others noticeably benefit from heavier metals. Fenders in general, and Strats in particular, tend to fall into the latter category.

They no doubt have their adherents, but the cheap alloy units that replaced the bent steel saddles of the pre-CBS era are considered to be the worst for tone. Steel rings clearer and brighter and stainless steel sounds brighter still. Slippery Graph Tech saddles are popular with heavy whammy-bar users, but can sound dark and lack bite. Brass saddles were a popular mod in the 70s and 80s and are claimed to improve sustain and thicken up tone.

Strat bridges with detachable blocks can also be modded. Heavy steel blocks were used in pre-CBS Strats and you can buy UK-made replacements from Kevin Hurley or Wudtone for a variety of bridge types and screw spacings. You can expect more open treble, improved definition and longer sustain than with cheap alloy blocks.

Also consider Killer Guitar Components' brass blocks and brass spring claws if you want a beefier tone with smoother transient attack. While you are changing blocks – or merely changing strings – try Eric Johnson's trick of removing the paint from the top of the block for direct metal-to-metal contact. He also removes lacquer from the neck pocket and the area beneath the bridge.

Alternatively, check out Wudtone's 'Whacker Plate' – a 0.5mm sliver of stainless steel that sits between the body and bridge plate to enhance bridge-to-body contact. It improves definition and clarity while providing a smoother vibrato feel.

CLASSIC TONES (AND HOW TO GET THEM)

The Shadows **Apache**

As well as being a huge hit and a major influence on most of the great British players of the 1960s, *Apache* is surely one of the most-sampled guitar tracks of all time, and one of the greatest sounding. It was recorded in 1960 and Hank Marvin would have played his late-50s Strat through a Vox amplifier – either an AC15 or one of his newer AC30s. With that combination, it's hard to go wrong, but the real magic (besides Hank's special touch) comes from the effects. Hank used a Meazzi Echomatic multi-tap echo unit gifted to him by Joe Brown and the engineers added reverb using one of Abbey Road's purpose-built reverb chambers.

A five-way switch makes it easier to nail the *Sultans Of Swing* tone – you'll also have to lose that pick

© Getty Images

CLASSIC TONES (AND HOW TO GET THEM)

Mark Knopfler
Sultans Of Swing

Nowadays, he's seldom seen with them, but the man who finally killed the three-way switch will forever be associated with a red, maple 'board 1961 Stratocaster. Knopfler's parts were probably recorded through the bright channel of a brown Tolex Fender Vibrolux amp that may have been fitted with a 12-inch Fane speaker. You can hear compression, but it's more likely a studio unit rather than the oft-suggested Dan Armstrong Orange Squeezer. The intermittent chorus effects would have been done with a Roland Jazz Chorus amp or with a Roland Dimension D processor. Crank to the edge of overdrive and select an in-between pickup setting.

Most great-sounding old Strat pickups have a degree of microphony – it adds extra upper-harmonic sheen

PICKUPS

Pickup swapping is the most popular Strat modification and deservedly so, because it has the biggest tonal impact of all. However, it can be the most expensive, and often the cause of greatest frustration.

If you take one lesson from this feature, it should be that pickup upgrades provide the best bang for buck when you're optimising a guitar that already plays well and sounds good acoustically. In other words, top-quality pickups should be regarded as a finishing touch rather than a miracle cure. For classic Strat tone, alnico magnets are essential. Some like bright yet softer-sounding alnico III slugs, but post-1955 Fender used alnico V slugs with bevelled edges. The bevels are also important for vintage tone. Until 1973, the slugs were staggered, however, Monty's and Lollar have both told us that flat slugs provide the most even string-to-string response.

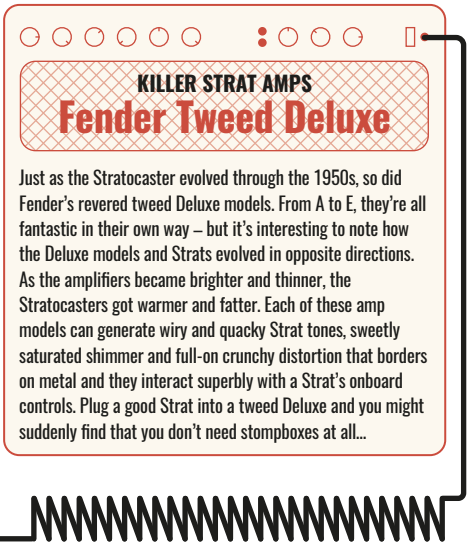
Scatter winding is a staple of most boutique pickups and heavy formvar wire is recommended for pre-CBS tone. Hendrix and Gilmour fans may wish to experiment with plain enamel wire. Hand-winding ensures the wire layers are less tightly packed – lowering the capacitance of the pickup and raising the resonant peak to achieve a clearer and brighter tone.

One sonic attribute common to all great-sounding vintage Strat pickups is some degree of microphony. Whether this is attributable to partial wax potting or a gradual loosening of the coils is debatable, but the upshot is an extra level of upper-harmonic sheen and vibrant touch dynamics that make a guitar feel alive. Few of the boutique winders are able to replicate this 100 per cent, but House Of Tone can.

ESSENTIAL STRAT EFFECTS

Reverb

Reverb can seriously muddy up some guitars, but it tends to work like a charm with Strats. In fact, a Strat with a clean amp and a tonne of reverb is just about all you need to play surf guitar. Lots of the old blues players liked to max out the reverb on their Fender amps, too. Just a hint can add a 3D quality to picked arpeggios. Increase reverb intensity and the decay time and you can create washes and keyboard-like pads. It's also fun to ride the volume control, to create swells into a heavy reverb effect. James Calvin Wilsey was the king of Strat atmospherics – if in doubt, check out Chris Isaak's *Wicked Game* for its heart-melting combination of Strat and Deluxe Reverb with a pre-delayed stereo chorus.



KILLER STRAT AMPS

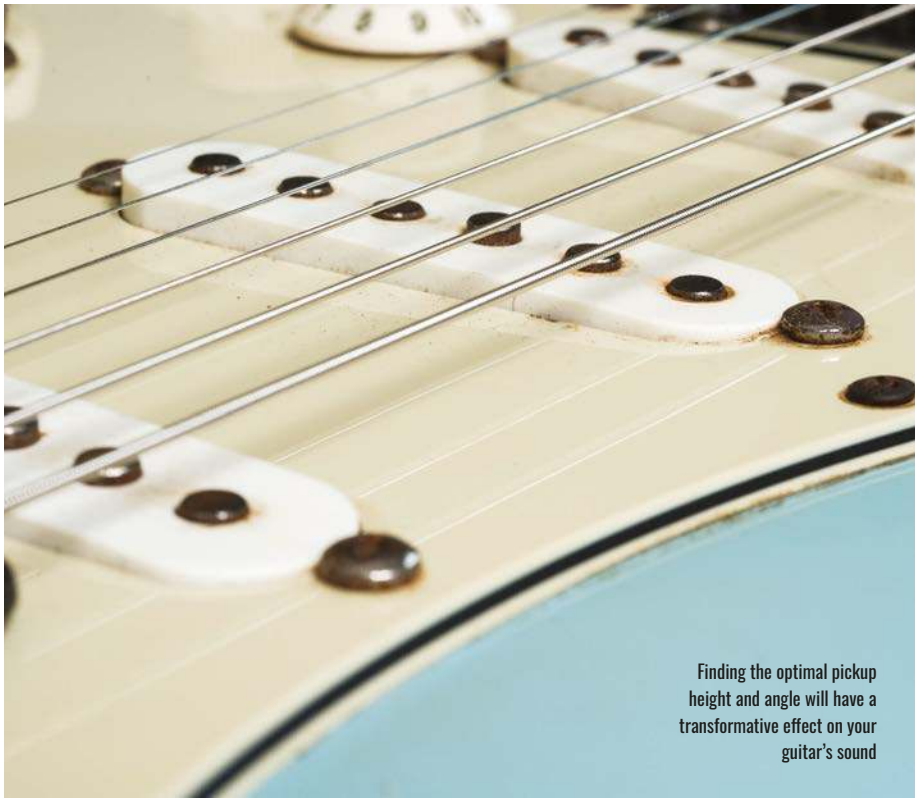
Fender Tweed Deluxe

Just as the Stratocaster evolved through the 1950s, so did Fender's revered tweed Deluxe models. From A to E, they're all fantastic in their own way – but it's interesting to note how the Deluxe models and Strats evolved in opposite directions. As the amplifiers became brighter and thinner, the Stratocasters got warmer and fatter. Each of these amp models can generate wiry and quacky Strat tones, sweetly saturated shimmer and full-on crunchy distortion that borders on metal and they interact superbly with a Strat's onboard controls. Plug a good Strat into a tweed Deluxe and you might suddenly find that you don't need stompboxes at all...

CLASSIC TONES (AND HOW TO GET THEM)

David Gilmour

Shine On You Crazy Diamond

This track is like a taster menu of Gilmour's Strat tones. His amps were reputedly a Fender Dual Showman and a Hiwatt DR103 and he played his black Strat throughout. The dark lead lines in the intro presage his *Another Brick In The Wall Part II* solo (though that was a P-90 Goldtop) with copious compression and a DI neck-pickup tone. The main figure sounds like the bridge pickup played through a Leslie rotating speaker and it's mic'd in stereo. The first solo has a compressed but clean tone, but Gilmour lifts the dynamic with extra bite and a hint of crunch from a Colorsound Power Boost on the turnaround, later adding an MXR Phase 90 – and all within the first eight minutes.

Finding the optimal pickup height and angle will have a transformative effect on your guitar's sound

PICKUP HEIGHT

The height of the pickups relative to the strings is crucial to dialling in your tone. Adjusting them is the only way to explore the full tonal potential of your pickups and after tweaking, your pickups may actually sound better than ever. Experimenting costs nothing and all you need is a screwdriver.

As long as the polepieces aren't touching the strings or the pickups aren't falling off the adjustment screws, any height is fair game and your ears will know when something's wrong. One hazard of setting the pickups too high is excessive magnetic pull on the strings. Magnetism inhibits string vibration, which reduces sustain and in extreme cases causes pitch anomalies. You are most likely to hear these as an atonal honk when playing the sixth (low E) and fifth (A) strings above the 12th fret.

Setting a pickup high emphasises treble and increases output level. But if you go too far, you lose sustain and the tone can become excessively shrill. Lowering will tame the aggression and provide a smoother, sweeter and clearer tone. Go too low, and reduced sensitivity and low output may become issues.

As with all things guitar, compromise is key. Optimising your pickup height settings may not be the magic bullet: however, it's absolutely essential to get all three balanced.

Set your amp at a medium volume with a neutral frequency response and switch to the bridge pickup. As you raise the height, listen to the way the sound changes. For now, keep the pickup flat rather than tilted and listen for tonal character and output level.

Once you're happy, pick through the notes of an open E chord and fine-tune the pickup height so the sixth (low E) and fifth (A) strings are equal in volume level to the second (B) and first (high E). You can try playing chords higher up the neck, too.

If the bass strings dominate, lower that side. If the treble strings are too bright, then lower that side. A little goes a long way and remember, this is about achieving balance rather than adjusting bass and treble. That's what your amp's tone controls are for.

With your bridge-pickup adjustment complete, switch to the neck. Again, the goal is to get a balanced tone from the pickup, but we're also trying to match its output level with the bridge pickup.

Switch back and forth between the bridge and neck for reference. Using vintage-style sets, where all three have the same DC resistance, the neck pickup will end up lower than the bridge.

Use the same procedure for the middle pickup and compare it with the neck and the bridge. Try holding a chord with one of the in-between settings selected. You should be able to hear the phasiness and quackiness change as the height changes.

Let your ears guide you and don't forget to check out the tonal differences between spacer springs and neoprene tubing. The springs may make your tone brighter and more microphonic – seriously!

KILLER STRAT AMPS

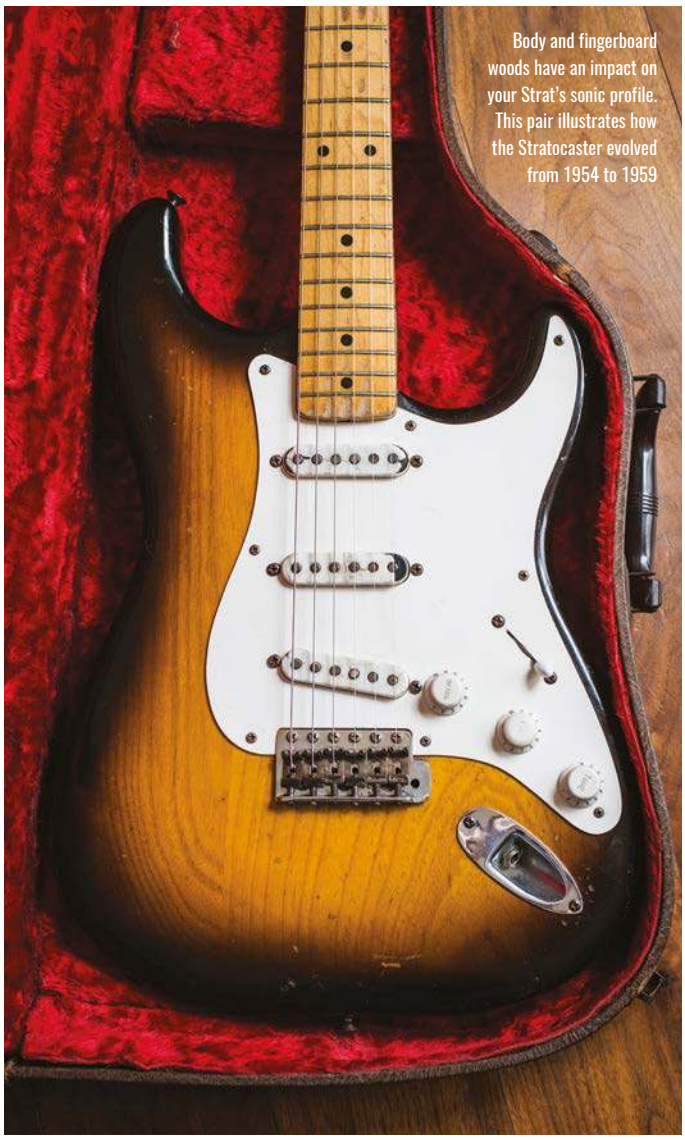
Fender Deluxe Reverb

Of all the classic Fender amps, the 22-watt Deluxe Reverb has just the right levels of volume, clean headroom and overdrive onset to be usable in most modern playing situations. Another great thing about these amps is that they carry two of the effects that Strats love best onboard – spring reverb and tremolo. The Silverface and Blackface models are almost identical electronically, so you can easily convert one to the other. This great all-round amp can do surf, blues, country, funk and classic rock. You can get beautiful mid-scooped early John Mayer tones, while pumping the midrange and the input with a Tube Screamer gets you close enough to SRV, too.

ESSENTIAL STRAT EFFECTS

Vibe

Rotating Leslie speakers were designed for use with Hammond organs, but mid-60s guitarists fell in love with the phasey swoosh and playing guitar through them became a popular studio trick. Unfortunately, the size and weight of a Leslie cabinet is closer to that of a small outbuilding than the average stompbox. Along came the Shin-ei Uni-Vibe and guitarists had a portable phase/vibrato/chorus device for Doppler fun in a gig-friendly format. Most synonymous with Hendrix, the Uni-Vibe is a key component in Robin Trower's tone and David Gilmour has also used them extensively. Even smaller versions are now available from Dunlop, Fulltone, Sweet Sound and TC Electronic.



Body and fingerboard woods have an impact on your Strat's sonic profile. This pair illustrates how the Stratocaster evolved from 1954 to 1959

WOOD AND FINISH

Hitherto, we've confined our discussion to things you can do to your current Stratocaster. However, there are some aspects you might want to consider when buying a Strat. An understanding of tonewoods and neck dimensions will help you make informed choices.

You may see basswood or other timbers on budget instruments, but we're talking tone. The very best Strats then and now have alder or ash bodies – although rare mahogany bodied Strats have been reported from the pre-CBS era.

Bodies with a lighter weight tend to resonate more freely. Ash is associated with a bright and clear tone with fast attack and deep lows. Alder tends to sound fatter in the mids and maybe a tad warmer, but each is a fine tonewood in its own right.

Stratocaster necks have almost always been maple, but they're often designated as 'maple necks' or 'rosewood necks', depending on the fingerboard. The earliest were one-piece maple, before Fender introduced the slab rosewood fingerboard that evolved into the veneer rosewood board – as seen on SRV's Number One. Later 'maple necks' from the Hendrix era had glued-on maple 'boards.

Maple necks are generally associated with bright tone. But since they were more of a 50s feature, when bright ash bodies combined with bright underwound pickups, we suspect the maple 'board is the least of it. Having swapped rosewood and maple necks on an alder Strat, we feel the 'board material has more impact on feel than tone.

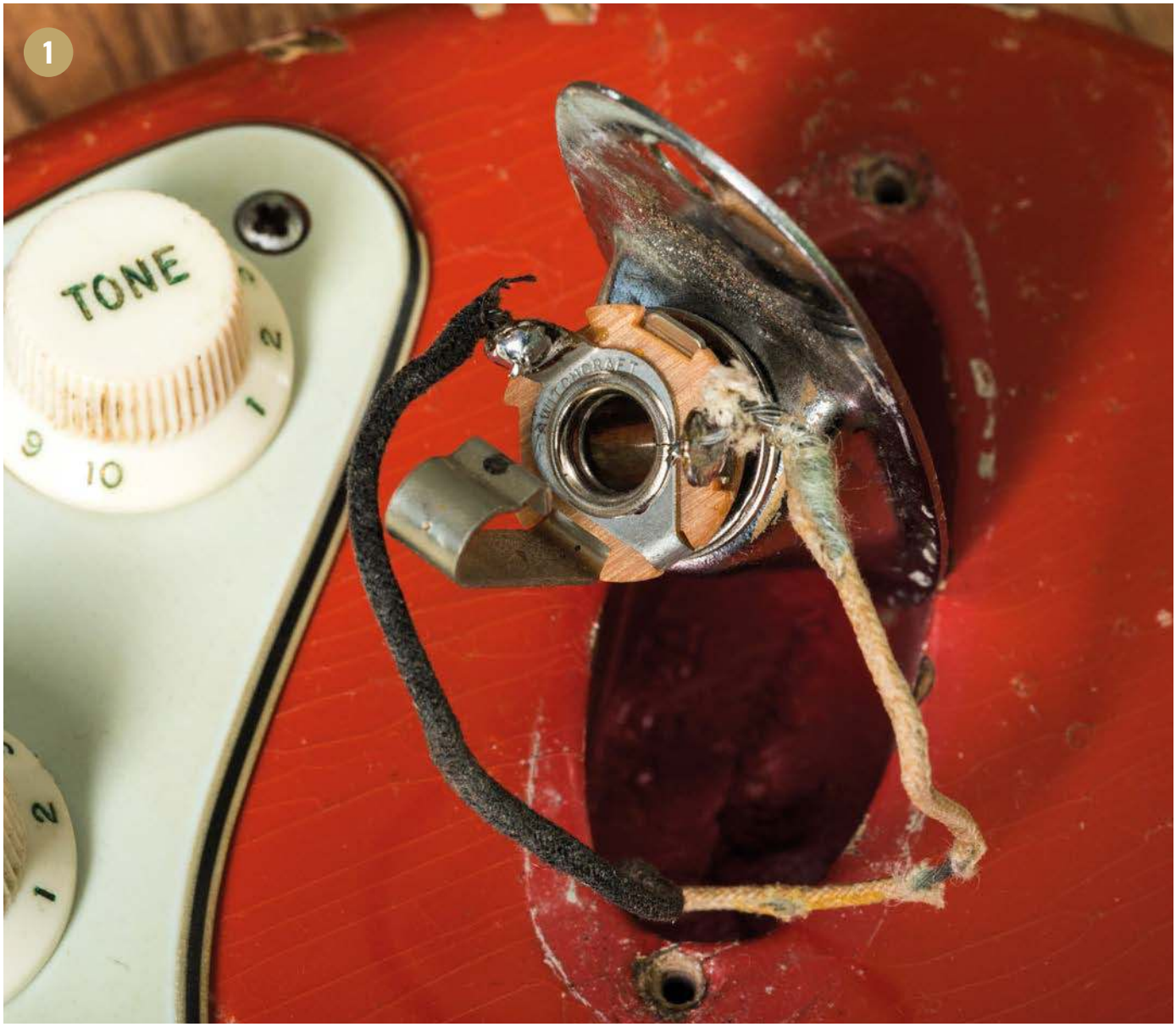
However, neck size does seem to be a factor and we have found that deep and substantial necks impart a snappier and brighter tone, with a touch more sustain. Thinner necks sound great, too, but we associate them with slightly warmer and darker tone. On balance, we think the body wood and its weight have more overall influence and you're better off just picking a neck that feels good to play.

Nitrocellulose looks gorgeous, ages gracefully and allows guitars to resonate – but it's not the only finish that does so. Run the rule over top acoustic builders such as Collings, Taylor and Bourgeois and you'll find that a variety of modern finishes are considered to be compatible with outstanding tone. We've played great-sounding Strats with poly finishes, and poor ones, too. The most important thing is that the finish should be thinly applied, irrespective of the material. **G**

CLASSIC TONES (AND HOW TO GET THEM)

Stevie Ray Vaughan Lenny

For the ultimate in pure, shimmering Stratocaster tones in the hands of a master player, it's hard to think of a finer example than this cut from SRV's debut album. Recorded with the guitar he called 'Lenny' – comprising a '65 alder body and a replacement maple neck – the *El Mocambo* video clearly shows flat slugs, so the pickups were almost certainly post-1973 Fenders. You can get close to this tone with any vintage-style Blackface Fender amp, but the fat mids suggest the 15-inch speaker of a Vibroverb, or maybe a Dumble. Lenny's vibrato was free floating and the lush reverb is a studio effect – probably coming from an EMT plate or an AKG spring.



ESSENTIAL SKILLS 3

REPLACE A JACK SOCKET

WORDS HUW PRICE

Guitar parts eventually wear out, especially mechanical parts that take a lot of use and abuse. Output sockets are a case in point and most of us will have experienced issues with our signal cutting out. Try wiggling two or more cables in the output socket.

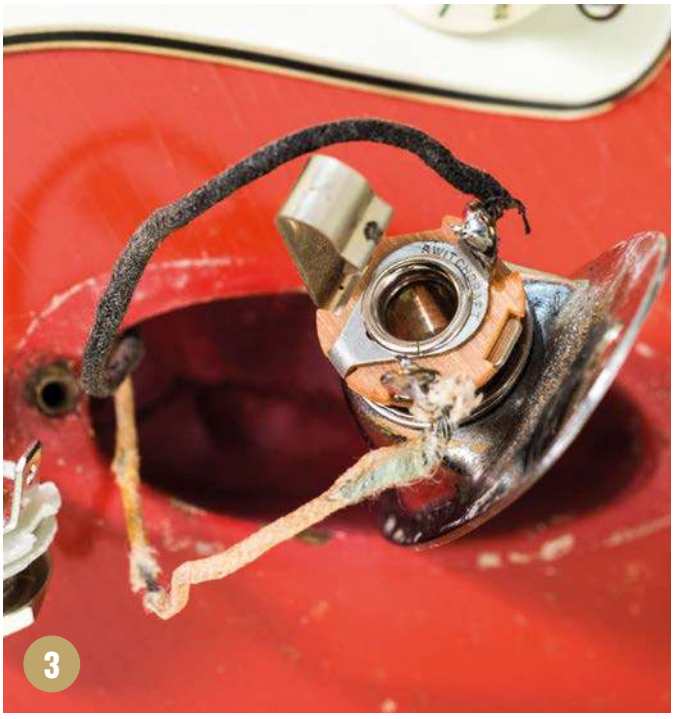
If the signal cuts in and out with each cable, you can be pretty sure the output socket is at fault.

Assuming you're not dealing with an original part on a vintage instrument, the sure-fire fix is to install a new output socket. In most cases, there will be just two connections. However, you may find a third wire if the bridge or trem spring claw is grounded at the jack socket, or if it's a switching jack for active pickup systems.

Replacing an output socket is pretty straightforward with Strats or Les Paul-type guitars, because it's easy to gain access to the socket. Semi-acoustics present problems because you will probably have to pull the socket, and all the controls, out through an f-hole. As for vintage-style Tele jack cups, you'd probably be best advised to leave those to a professional.

Assuming that you can get at the socket, make a note of which connection is positive and which is negative. The negative (or ground) will usually be black. Heat a joint with a soldering iron and pull the wire away as soon as the solder melts. Then do the same with the other wire.

Unscrew the nut holding the socket in position and remove it, then fix the new socket to the plate or cup and solder the wires onto the new socket. Ensure the wires do not move as the molten solder is setting and never try to speed up the cooling process by blowing on a solder joint. ***G***



1 This jack socket has two solder tags. The black wire is soldered to the sleeve and you can see that it's connected to the centre of the socket. The white wire is soldered to the tip tag and that corresponds to the protruding section

2 Switchcraft is a popular and reliable brand for jack sockets. You can get these from Allparts UK

3 A new jack socket, waiting to be installed

4 The wires are de-soldered from the jack's solder lugs. This process will be reversed, then the new socket is fitted

5 With the changeover complete, the jack cup is screwed back onto the Stratocaster body

WHY YOU NEED THIS

Intermittent or failed contact causing guitar signal to cut out

WHAT YOU NEED

Pliers; soldering iron; solder; needle pliers

VOLUME
TONE
TONE

10 STEPS TO A PERFECT STRAT SET-UP

Of all the classic electric-guitar models, the Strat is perhaps the most complex to set up. Having said that, there's no real mystery to it, and it's well within the scope of any Stratocaster owner to get their guitar playing properly with accurate intonation and stable tuning.

Perhaps the key is to approach a Stratocaster setup in a holistic manner rather than viewing it as a bunch of unrelated procedures. Getting a Strat set up is – quite literally – a balancing act, assuming of course that you plan to use the vibrato as Leo intended.

There's no point in setting the intonation perfetctly, for example, or the saddle heights for that matter, until you have balanced the bridge. If you do, you'll only end up having to go back and do everything again.

And so the purpose of this handbook is to take you through the processes involved in a Stratocaster set-up in a logical sequence. If you follow these steps in the given order, it should help you to avoid having to repeat certain tasks and give you a thorough understanding of the processes involved and the mechanisms at work. Good luck!

G
F
E
C
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I
J
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K

WHAT YOU'LL NEED

- A Steel ruler
- B Radius sanding block
- C Selection of Allen keys
- D Capos
- E String winder
- F Pliers
- G Wire cutters
- H Nut files
- I Cross-head screwdriver
- J Flat-head screwdriver
- K Stiff-bristled brush
- L Guitar lubrication

1 INITIAL EVALUATION

Whenever you are embarking on a guitar set-up, you should start with a thorough evaluation. The first thing is to find out if everything is working as it should and whether the guitar actually plays. After all, if the switch or one of the pots has failed, you'll want to fix the electronic issues before putting new strings on a Strat and balancing the vibrato. One of the reasons guitars such as Teles and solidbody Gibsons are easier to maintain is that the strings do not obstruct access to the electronics.

Tune the guitar to concert pitch and check whether the bridge is floating above the body. If it is, you'll see a gap at the back of the bridge between the bridge plate and the surface of the body. If that gap is wider than 3mm or so, you may need to tighten the spring claw until there's about a credit card's width between the body and bridge. This is just about establishing a workable starting point – we'll explore vibrato balancing in detail later on.

If the bridge is flat to the body, take off the spring cover and check to see if the bridge has been blocked to disable the vibrato. Some players prefer it that way, but if you want to use the whammy bar, that block will eventually have to be removed.

At this stage, it's more important to see if the guitar plays, and the method is simple – just tune it up and play it. You don't need feeler gauges or a ruler to tell you whether the action is high or low – just rely on your own experience.

Do the strings choke out when they're bent, or can you hear a lot of buzzing and rattling? If so, the action is set too low. Conversely, if you're finding it hard to fret notes and it hurts your fingers to play, the action is probably too high.

Avoid the temptation to dive straight into adjusting saddle height. Issues of this sort are often indicative of a neck that has too little or too much relief. So first assess the condition of the neck with the strings tuned to pitch.

There are a couple of easy ways to do this. Firstly, fret one of the strings at the first and 15th frets. You can use your fingers or capos. Next, press the string towards the 'board at the seventh fret. There should be a slight gap between the bottom of the string and the top of the fret. If there isn't, the neck might be too straight or, worse still, it's back bowed. If the gap is greater than 0.5mm, the neck has an upwards bow and the truss rod may need to be straightened.

Before proceeding, you need to find how far out the neck is. There's not much point in laying a steel ruler along the top of the frets because you won't learn much about neck straightness if the frets are worn and uneven. Instead, run a ruler along the edge of the fretboard. Line up each end of the ruler along the join between the fingerboard and the maple. If there is some relief, you should see some rosewood or slab maple (if you have a non-slab maple 'board, see step 1) below the ruler line around the seventh fret. If you can't see any rosewood, move the ruler so it's below the 'board and check if you can see any neck maple peeking above the straight edge. If you can, that will probably indicate a back bow.

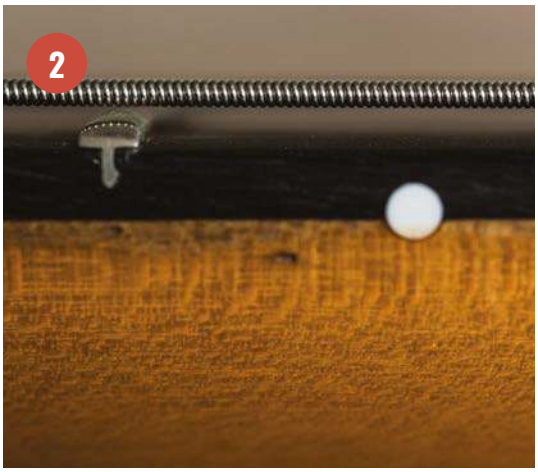
Techs can often tell the condition of a guitar neck just by looking at it, but it takes experience. If the up bow is excessive, it may not be possible to correct it by adjusting the truss rod. Vintage-style truss rods are not designed to fix back bows and if the neck is twisted, regular truss rods will be of no use. So if you think your Strat has a twist or a back bow, take it to a tech for a second opinion. A replacement neck might work out cheaper than getting the original fixed.

WHY YOU NEED THIS

There's no point in trying to fix something until you have identified the issues

WHAT YOU NEED

A keen eye, a metal ruler or straight edge, one or two capos



1 The ruler lines up with the neck/fingerboard join at both ends. The line of rosewood visible below the ruler at the seventh fret reveals a slight up bow. If you don't have a guitar with a rosewood or slab maple 'board, align the ruler where the top of the 'board touches the fret instead, and if there's an up bow, you'll see an air gap between the top of the 'board and the bottom of the ruler

2 The up bow provides some neck relief, which can be seen as a gap between the strings and the frets in the middle of the neck

1

1 The spring cover has been removed to access the springs and lift out the bridge. All the parts are saved carefully in the plastic cup

2 Lifting out the bridge makes it easier to clean. Brush off the dust and dirt then polish up with a dry cotton cloth

3 Before refitting the bridge, we like to add some lubricant to the bridge screws. Here, we're using Big Bends Nut Sauce

2 TEAR DOWN, CLEAN UP AND LUBE

When you're performing a full set-up on a guitar, it's worth taking the opportunity to give it a bit of a spruce up. Dirt and dust tends to build up on the bridge, so after removing the strings, try cleaning it with a stiff bristled brush and polish the plate with a clean cotton cloth.

If you're working on a Strat with two pivot screws, it's easy enough to remove the springs and lift out the entire bridge. This makes it simpler to clean the bridge parts, and you can add a dab of lubricant to the contact points on the pivot screws.

On a vintage-style bridge, removing the springs might enable you to get some lubricant under the six retaining screws. Big Bends Nut Sauce tends to work well, because you can get the applicator into the right areas.

If the fingerboard is mucky, try cleaning it using a cloth soaked in naphtha – aka lighter fluid. You can buy it in most corner shops and with patience, you can lift off most of the grease, dirt and dried skin from maple, rosewood and ebony fingerboards. Try to get right up to the fret edges because dirt really builds up there.

With cleaned rosewood and ebony 'boards, you might also try some fingerboard conditioner or oil. Lemon oil works nicely, or you can even use baby oil. Refined linseed oil works too and will darken the fretboard – assuming you can stand the smell. Allow the oil to soak into the wood for several minutes then wipe away any excess and buff up the 'board with a clean cloth.

If you're a fan of the relic'd look, you might prefer to leave the pickguard untouched. If not, you should be able to wipe off any dust and dirt with a damp cloth then buff it up with a dry one.

Take a brush and cloth to the headstock, too and clear the nut of any gunk or foreign bodies that have built up.

Nitrocellulose-finished necks can begin to feel increasingly sticky over a prolonged period of time, as they absorb grease and dirt. Sometimes they polish up nicely, but you may need specialist products to draw out the dirt completely.

We've had great results when using Virtuoso Premium Cleaner and Premium Polish, but there are various other products out there that will do the same job.

If your tuner buttons are dirty, you can bring up the shine with some metal polish, but stick to dry cotton cloth if your hardware is gold plated – otherwise it won't be for much longer.

WHY YOU NEED THIS

Clean guitars tend to be more reliable, easier to maintain, feel nicer to play and your strings will last longer

WHAT YOU NEED

A clean cotton cloth, a brush with fairly stiff bristles, naptha fluid, fingerboard conditioner/oil, guitar lubricant, polish

1

2

3 TRUSS-ROD ADJUSTMENT

Vintage-style truss-rod adjustment is located inconveniently at the body end of the neck, so you're obliged to loosen the neck screws and lift up the end of the neck to expose the truss-rod screw. Later designs have the adjustment at the headstock end, and while this may not have the vintage kudos, it makes a lot more sense, because you can adjust the neck relief with the neck actually under string tension.

So if yours is a vintage-style neck, you will need to make initial adjustments before you restring the guitar. For this reason, we would suggest preserving the old strings so they can be used when adjusting the neck relief. Since the strings are likely to be on and off a few times, it's preferable to use the old ones rather than risk breaking new ones – assuming you're sticking with the same gauge.

Remember that truss rods are intended for making minor adjustments and they're not 'neck straightening devices'. If there's too much up bow, try turning the truss rod clockwise by a quarter turn and assess the results after a few minutes with the strings tuned to pitch. If there's still too much relief, try another quarter turn and repeat the process until your relief feels 'right'. We'll address what that means shortly.

If the starting point is no relief or even a back bow, turn the truss rod anticlockwise, again in quarter-turns. Back bows can be bad news, but try slackening off the truss rod completely, tuning the strings a tone sharp and leaving the neck to settle overnight.

If you're very lucky indeed, the string pull might straighten out the back bow or even introduce a slight up bow. If so, tighten the adjuster back to the very start of the bite point and drop the strings back down to concert pitch. You can find all sorts of facts and figures with suggested relief measurements, but all assume that the frets are perfectly level. Since we tend to play in the key of A rather a lot, most guitars have extra fret wear between the fifth and seventh frets, so relying on feeler gauges can be misleading. There's nothing wrong with setting neck relief by playing the guitar and testing how it feels and sounds. If necessary, set the saddle heights so the action is roughly where you want it and begin making the truss-rod adjustments you need. As relief decreases, the action should drop and the guitar may feel easier to play. However, you will notice the tone losing fullness and some buzzing and choke out may become noticeable as the neck straightens.

Generally, it's a matter of finding the best compromise between easy playing and clear buzz-free tone, and you might find it best to work with the guitar unplugged. Also, a lot of neck relief combined with low saddle heights often results in a guitar that plays cleanly up to the 12th or 14th fret, but buzzes across the higher frets.

It's about tone and feel, and most of us will have preferences. Some find extra neck relief necessary when fingerboards have a tight radius – like the 7.5-inch radius on vintage-style Strats. Your ears and fingers will tell you more than a radius gauge.

1 For modern Strats, you'll need the correct-sized Allen key. The USA models take 1/8" and the Asian ones are 4mm

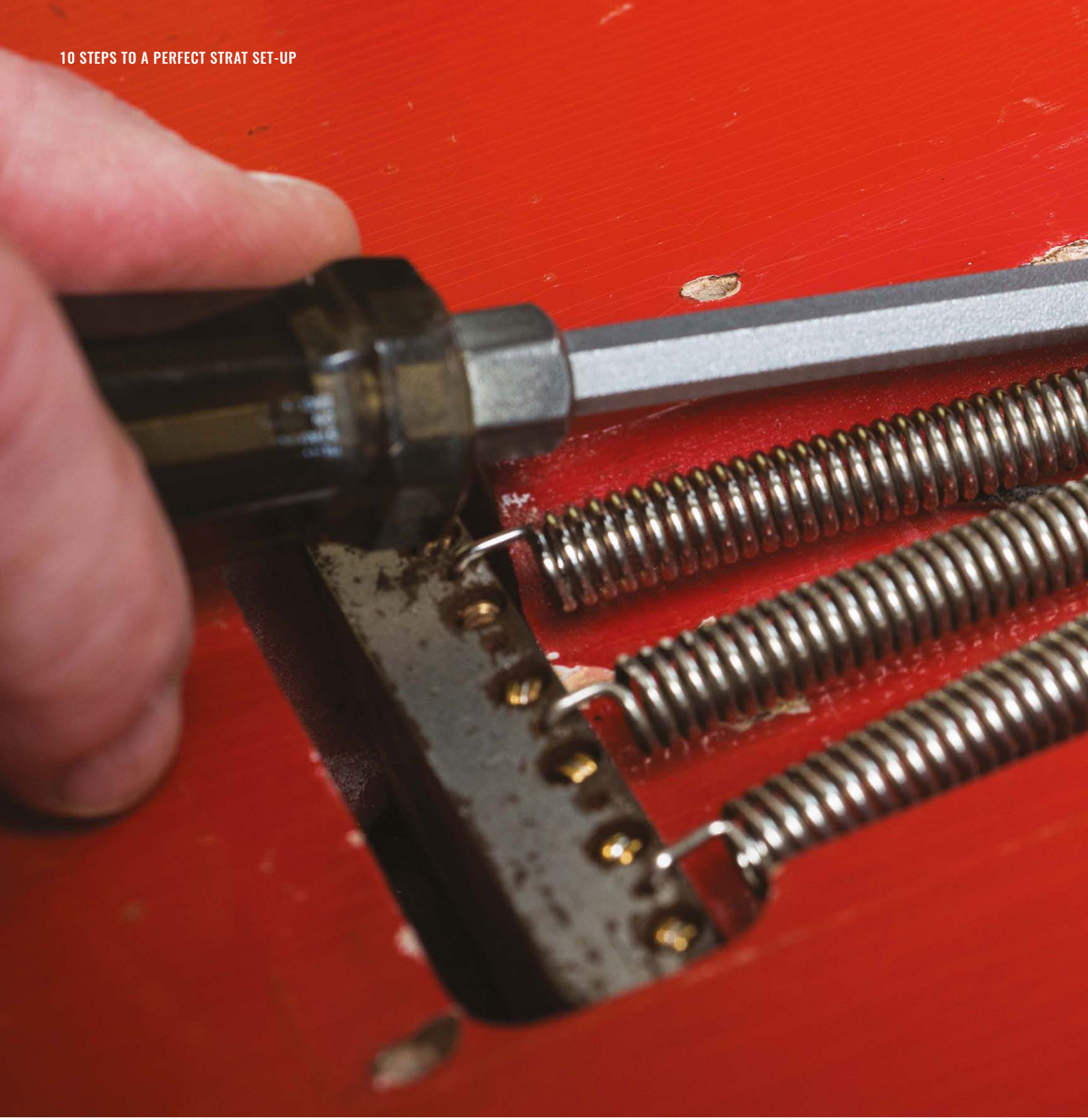
2 You'll have to pop up the neck to adjust the truss rod of vintage-style Strats. Remember to slacken off the strings first or it may get ugly

WHY YOU NEED THIS

For clean and clear tone, plus easy playability

WHAT YOU NEED

An Allen key or screwdriver, feeler gauge (optional)



4 SPRING CLAW ADJUSTMENT

When you're used to playing fixed-bridge guitars, Strats can throw you a curveball. Bending strings exerts extra pull on the bridge, so it will tip forward as you bend. While you're trying to bend the note sharp, the guitar is trying to go flat.

Most seasoned Strat players get used to 'over bending' to compensate – often subconsciously – so they're not even fully aware of the issue.

However, when you're playing doublestops with a fixed note on one string and a bent note on an adjacent string, the fixed note will sound slightly flat in pitch.

Consequently, some famous Strat players, most notably Eric Clapton, don't even use their vibrato systems and have them blocked off. The term is literal, because the way to do it is to wedge a block of wood between the bridge block and the side of the body rout. This completely fixes the bridge and the bridge plate sits flat on the body.

Others deal with the issue by using four or five springs to resist the string pull. However, this can make the whammy bar action feel stiff and unresponsive, so the majority of Strat players settle for a compromise with three springs – one straight and two angled.

WHY YOU NEED THIS

To set the feel and range of the vibrato system

WHAT YOU NEED

A large cross-head screwdriver

1 To get at the spring claw screws, a large cross-head screwdriver with a long shaft is the best tool if you want to avoid scratching the finish

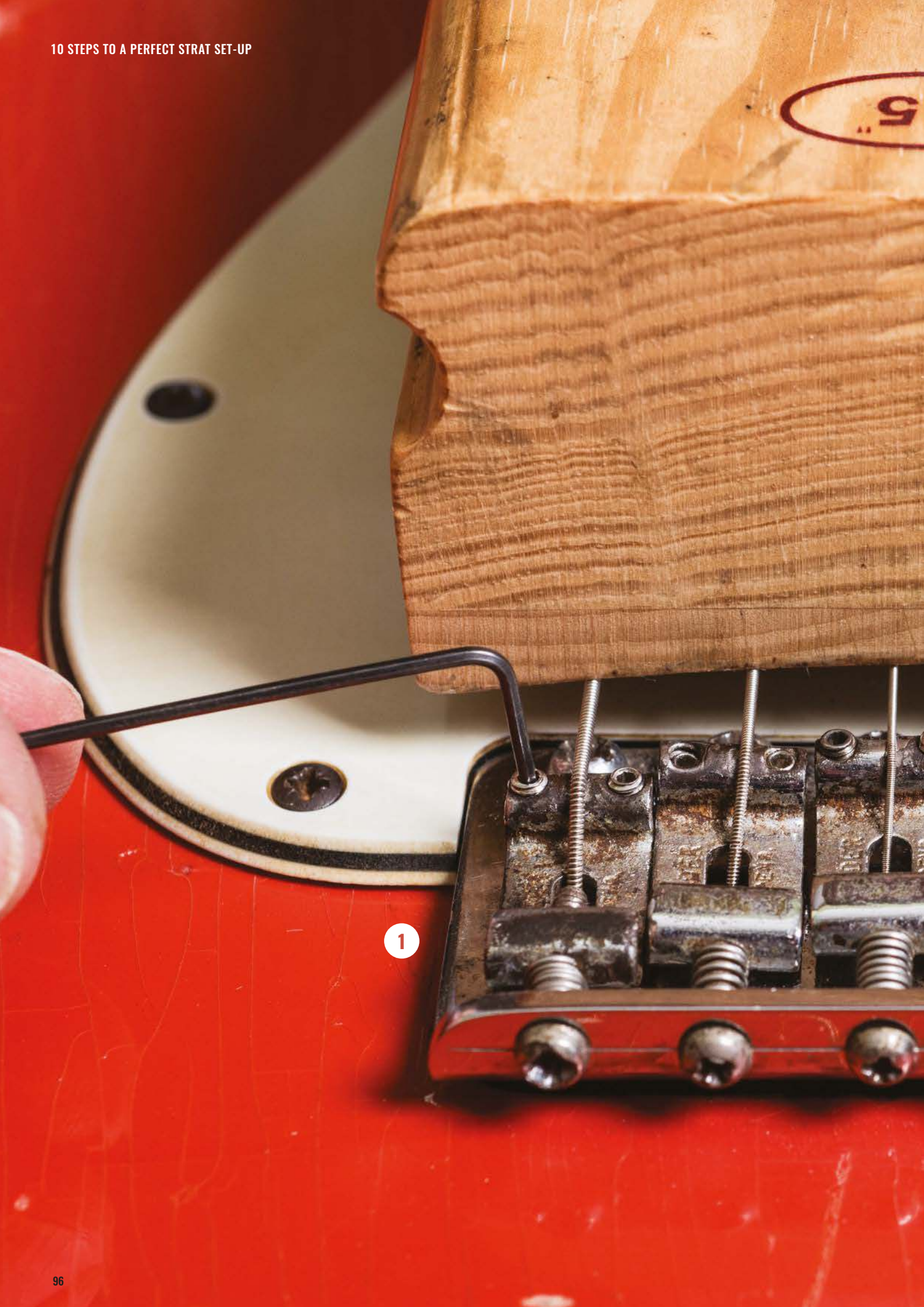
Fender intended the 'Synchronized Tremolo' to be a floating unit, with the spring tension balancing out the pull from the strings and the bridge base sitting above the body. There are no absolute rules about setting spring tension, because all players require different feels. Some don't require any upward movement, but most prefer to be able to achieve vibrato above and below pitch.

Once you've settled on the optimum number of springs and their orientation – straight or angled – the two screws fixing the spring claw to the body can be adjusted to fine-tune the feel of the system.

Work in small increments, because slackening off the claw screws decreases spring tension, which allows the strings to pull the bridge forward. However, this also flattens the strings, so when you bring them back up to pitch the string pull is even greater and the bridge tilts even further forward.

Similar complications occur when you increase the spring tension, because the springs pull the strings sharp. Tune back to pitch and the bridge will be pulled even flatter to the body – making the strings go sharp. Either way, the system gets a 'double whammy'.

If you work slowly and make only small adjustments you'll soon be able to zone in on the feel and range of movement that suits you. It can be done with surprising precision – session ace Carl Verheyen advocates tuning vibratos so the third, second and first (G, B and E) strings pull up a minor 3rd, tone and semitone respectively. It sounds very musical and is easy to set up.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5 SADDLE HEIGHT ADJUSTMENT

We've left this until relatively late in the process, because string height – or action – on a Strat is determined by neck relief and the pitch of the bridge as well as saddle height. If you start with saddle height adjustment without addressing the other issues, you'll end up doing this more than once.

Most of us prefer as low an action as possible, so here's our recommended procedure. Having completed all the truss rod and spring claw adjustments and tuned the strings to concert pitch, adjust the first (high E) string saddle as low as it'll go without string bends choking out. Fractions of a turn on the saddle screws can make a huge difference and we prefer to keep the saddles level. Grub screws usually have flat bottoms, so keeping things square maximises the physical contact area between the saddle screws and bridge plate.

Now switch your attention to the sixth (low E) string and set the saddle height so it plays cleanly all the way up the neck. If it buzzes when fretted, the saddle is too low. If it buzzes only when played open, the nut slot is probably too low, so put a capo on the first fret to adjust the saddle height.

With the two outside saddles done, place a radius gauge or a radius sanding block across the strings to assess the string radius. You can download a printable radius gauge from Pickguardian.com, and the one you use should match the fingerboard radius. Adjust the A,D,G and B saddles so the strings all sit below the curve and the gauge or block is resting on the two E strings. Carefully adjust all the low saddles upwards until the strings just touch the bottom of the curve – you're done.

The string curve radius can (and perhaps should) be slightly flatter than the fingerboard radius; in which case, you can lower the four central saddles very slightly. Once again, this is a procedure where your ears and fingers can help you to optimise the set-up even after you have taken measurements.

Although this method can achieve excellent results, Strat players often find themselves dealing with saddle screws that protrude high above the saddles. The set-up might feel great to play, but try palm muting and it will be less than comfortable.

There are two ways around this. Firstly, the protruding screws are usually most evident on the lowest saddles – the Es and maybe the A and B. If that's the case, and the D and G saddle screws don't protrude, you can buy short saddle screws from suppliers such as Allparts UK. Make sure you order the right ones because USA-made guitars require imperial screws and Mexican and Far Eastern guitars will have metric threads.

However, if all the saddles are set really low and the height adjustment screws are protruding, you may need to tilt the neck backwards. The Fender factory used thin shims during Leo's era, but later designed a 'Micro Tilt' system with a grub screw. When shimming a neck, we use a very thin length of wood veneer across the end of the neck just in front of the two deepest neck screw holes.

The shim or angle screw will tilt the neck to introduce a back angle and it moves the 'board closer to the strings. This requires the saddles to be set higher, which means the height-adjustment screws will protrude less – if at all. We prefer not to shim or tilt because we like to maximise the contact area between neck and body, but sometimes it's the only option. However, modern-style bridges with a screw at each end allow you to adjust the overall bridge height as well as the saddle height.

If your guitar has that arrangement, try setting the bridge height before adjusting the saddles or shimming the neck.

On occasion, the plain strings fail to produce a clear tone, and in the worst cases you may hear a sitar-like effect. If this happens only when the string is played open, there's probably something wrong with the nut slot. But if it occurs whether fretted or played open, there is probably an issue with the saddle. Over time, the strings can wear grooves into the saddles that prevent the strings from taking off cleanly. If it's a non-collectable guitar, it could be time for a saddle upgrade.

On older guitars, you could try swapping the offending saddle with a saddle currently under one of the wound strings. You can also file out the groove and smooth the metal with abrasive paper and metal polish.

1 Each saddle will have two little grub screws to adjust the saddle height. On old guitars, you may need to dig out the dirt before you can get an Allen key deep enough to turn without stripping the screw

2 A radius block being used as a guide for the string radius. You can also download printable radius gauges from the website Pickguardian.com

3 With modern-style Strat bridges, you can adjust the base plate height as well as the saddle height. On vintage bridges, the six screws are merely retainers and cannot be used to set the bridge height

WHY YOU NEED THIS

To set the string height

WHAT YOU NEED

The correct Allen key for your saddles

1

6 ONTO THE NUT

We've already touched briefly on nut issues and now that the neck relief, spring claw and saddles have been set, it's time to go into greater detail. A properly slotted nut is essential for the feel and tone of any guitar. It's crucial for tuning stability, too – especially when the guitar is equipped with a vibrato unit.

There are various factors to consider and the first is slot height. If the slot is cut too deep, the take-off point for the string will be lower than the first fret and the string will buzz when it's played in the open position. If it's too high, the string may ring clearly, but the guitar can feel stiff and uncomfortable to play. Getting the slot depths spot on requires a degree of skill and ideally access to nut files. Cutting nut slots is a fairly specialised procedure, so you may prefer to leave it to a tech. However, there are a few other nut issues that you might be able to address yourself.

Open strings can sometimes sound a bit dull and choked when the nut slot is too narrow for the string. You can wrap some 1,000-grit paper around the string and try to widen the slot. Some prefer to use a fret file of the next gauge up to achieve the same – so a B-string file in an E-string slot.

Take care to avoid touching the bottom of the slot. Try rocking the file side to side, or maybe flaring the slot outwards on the tuner side to minimise the potential for the slot to 'pinch' the string.

Another symptom of a badly cut nut is a double groove at the bottom of the slot. This often manifests as a click or ping when you bend a string and it jumps from one groove into the other. You can always feel it and sometimes you'll even hear it. Take some 1,000-grit paper, fold it loosely and use it to smooth the bottom of the slot. The object isn't to make the slot deeper, just to remove the grooves. Work slowly, check your progress regularly by popping the string back in the slot and bending, and stop as soon as the string bends smoothly. To get the slots really smooth, place masking tape along both sides of the nut to protect the fingerboard and polish the slots with chrome polish and a cotton rag.

Many techs agree that the nut is one of the key determining factors in the playing feel of a guitar. You may have noticed how some guitars feel stiff and uncooperative even when the frets are in good shape and the action is set low. In contrast, a similar model with an identical setup can feel smooth and slinky.

The difference may be the ease with which the strings slide back and forth in the nut slots, and the mysterious process of 'playing in' a guitar is really about finessing the nut slots through continual use. Armed with this knowledge, you can accelerate the process by ensuring the nut slots are smooth and slippery. In addition to improving tuning stability, your Strat will play better than ever.

1 Properly cut nut slots are crucial for tuning stability, playing feel and open-string tone

2 Nut files are expensive and only worth buying if you intend doing a lot of nut work. Most of the basics can be done with fine-grade abrasive paper wrapped around the strings or folded to fit the slots

WHY YOU NEED THIS

For optimum playing feel and tuning stability

WHAT YOU NEED

The correct Allen key for your saddles

1

1 Wrapping the strings down the tuner posts creates a good break angle over the nut. This optimises open-string tone, but if you make the angle too steep, it can prevent the strings from moving freely in the slots

2 Check out the third (G) string because it's creased across the opening of the saddle and that can be a break point. Plastic sleeves have been slipped over the second (B) and first (E) strings to cushion them

3 Plastic sleeves under the string tree can reduce friction and enhance tuning stability

WHY YOU NEED THIS

Getting this bit right optimises tone and tuning stability

WHAT YOU NEED

Wire cutters and a string winder (optional); cotton rag

7 FITTING THE NEW STRINGS

In order for an open string to ring clearly, it needs a clean 'take-off' point from the nut. Guitar techs will often cut nut slots slightly angled downwards towards the tuners to achieve this. This angle is referred to as a 'break angle' and more traditional guitars than Fenders have always had angled headstocks to ensure a break angle is always present.

To achieve a decent break angle over the nut on a Stratocaster with vintage-style tuners, there's a technique that you should follow. Regardless of how the string attaches to the post, the key is to achieve a proper break angle through multiple wraps around the tuner post. Each wrap goes under the previous one, and the string tension will eventually pull them tightly together. The more wraps you get onto the post, the more acute the break angle.

Initially, Fender had just one string tree, for the second and first (B and E) strings, but later began using a second for the fourth and third (D and G) strings. If your Strat has string trees, you needn't bother with post wrapping because the string tree height determines the break angle. Of course, you can still alter the angle by inserting a spacer between the headstock and the string tree.

Eric Johnson has long maintained that you don't need string trees at all and that it's preferable to dispense with them because they are a source of friction and therefore tuning instability. His signature Strat has staggered tuner posts and a few millimetres skimmed off the front of the headstock to make it work, but it's perfectly possible to remove the trees on a regular Strat and wind the second and first (B and E) strings to the base of their tuner posts.

There are several areas on Strats that can lead to string breakage, and SRV's tech René Martinez used a few tricks to minimise breakages from his heavy-handed employer.

Check the bridge area for the point where the strings exit the holes in the base plate. Sometimes the angle is such that the string is pulled tight against the sharp edge of the hole. The openings in the saddles can also be potential breaking points.

The simple solution is to strip the plastic insulation off electrical cable, cut it into short lengths, slip the plain strings through the middle and use the plastic to cushion the break points. You can do the same thing to guide the strings under the string tree.

1

8 SETTING THE INTONATION

You probably thought we'd never get to this stage, but we left it until this point in the process because the neck relief, bridge balance and a height all have a bearing on a guitar's scale length. Although you can use a guitar tuner to adjust your intonation, the virtual 'strobe tuner' apps that you can download for smartphones and tablets are incredibly accurate and display tuning in fraction-of-a-cent increments.

Using the 12th-fret harmonic/fretted-note comparison at the 12th fret is a perfectly valid approach, and it can achieve good results, but it's crucial to ensure all the strings are tuned accurately to concert pitch before making adjustments.

Remember the bridge position is the result of the balance between spring and string tension, so if some of the strings are not at concert pitch the bridge will not be at its null point and any adjustments that you make will be inaccurate. There's another complicating factor when you're setting Strat intonation – the magnetic pull from the pickups inhibits string vibration as you move up the neck and the fretted notes get closer to the pickup slugs.

This is particularly noticeable on the sixth and fifth (low E and A) strings, when the pitch of the notes sounds slightly flat. This will make any comparison between the note and the harmonic at the 12th fret spurious, and setting the intonation will become little more than guesswork.

The solution is to adjust the pickup heights so they're as far away from the strings as possible. With the reduced magnetic pull, you should be able to set the intonation without difficulty.

If the guitar was sounding good before the setup and you liked the overall balance of the three pickups, you might want to measure the pickup heights before dropping them down so you can return them to their original positions. Although the excessive string pull will return, many players are so used to the phenomenon they just work around it.

WHY YOU NEED THIS

To make the guitar sound in tune all the way up the neck

WHAT YOU NEED

A cross-head screwdriver with sharp tip and a long shaft

1 Use a long-shaft screwdriver to set the intonation, otherwise your screwdriver might slip off the screws and scratch the paint. Bad news, unless you're shooting for a relic'd look

1

2

9 SETTING THE PICKUP HEIGHTS

Again, there is no 'right' way to do this, but there are factors to consider. Getting the magnets and coil close to the strings increases treble and output level. Dropping them further away removes some of the edginess and results in a smoother and more open tone, but output is lower.

Setting pickup height is a trade-off between tone and volume, and much depends on your priorities and taste. With multiple pickups, it's also a balancing act because ideally the pickups will all produce the same output level. As Strats have three pickups, it's a bit trickier to achieve – but it's not too hard.

Here's the method we use, and we think it yields pretty good results. Having just set your intonation, your pickups should all be adjusted pretty low.

With an amp at a medium volume level and the tone controls set neutral, we begin with the bridge pickup. Raise the height and listen to the way the sound changes, and experiment to achieve your preferred tone and output level – always trying to keep the pickup level across the top. Once you're happy, pick out the notes of an open E chord and adjust the pickup height so the sixth and fifth (low E and A) strings are at the same volume level as the second and first (B and high E). You can test this by playing chords higher up the neck, too, and the object is to get every string ringing out at virtually the same level. If the bass strings dominate, lower that side of the pickup. If the treble strings are too bright, lower that side.

Once you're happy, move to the neck pickup. The initial goal is to get its volume balanced with the bridge pickup so, again, keep the pickup level and go for a general balance before fine-tuning the treble and bass strings. You should be able to play a figure on the second and first (B and E) strings on the neck pickup and then play it again on the bridge pickup with no change in volume.

Since their physical locations make the neck pickup the loudest and the bridge the quietest, the neck pickup will end up further from the strings. If you recall the magnet pull issue we mentioned, you'll know this is no bad thing. The procedure is broadly similar for the middle pickup, but this time you have two pickups to compare, as well as the in-between positions. After achieving a basic pickup-to-pickup balance, you can fine-tune the in-between positions because the 'phasiness' is quite dependent on setting the pickup height.

If you're quick enough with the screwdriver, you can play a chord and hear the sound change as you move the middle pickup. Once it's dialled in for maximum quackiness, the middle pickup usually balances well with the other two.

WHY YOU NEED THIS

To achieve a balanced tone with even pickup-to-pickup levels

WHAT YOU NEED

A cross-head screwdiver

1 A screw at each end of the pickup allows you to set the height

2 When setting intonation, you may achieve more accurate results if you lower the bass sides of the pickups before you start. In the process, you may discover the balance is improved and they sound better

10 STRING STRETCHING

New strings always take a little while to settle down and stay in tune consistently, but you can circumvent the 'settling' process somewhat by stretching them. Put on your new strings, tune them to concert pitch then wrap your fingers under the sixth (low E) and pull it upwards – away from the fingerboard. Start at the nut end and work your way along the string, all the way to the bridge. You'll feel it stretch and the pitch will drop, so tune it back up to pitch and repeat the process. Usually, you'll find you need to do this at least three times before the string maintains its pitch.

Move on to the fifth (A) string and do it all again, then stretch each of the other strings in turn. Be careful not to stretch the plain strings too much, because it's easier to snap those than the wound

WHY YOU NEED THIS

To help new strings settle in quickly and stay in tune

WHAT YOU NEED

Your fingers, a tuner and some nut lube

strings. It's better to carry out four or five gentle stretch cycles than rush the whole process.

It's also advisable to place your hand over the stretched string, just behind the nut and press downwards. The idea is to avoid pulling the strings off their tuner posts and snapping them on the sharp string-tree edges.

Only after stretching the strings would we advise lubricating the nut slots. You can use graphite from a soft pencil, petroleum jelly or a specialist product such as Big Bends Nut Sauce.

One of the reasons we prefer bone nuts is the bone absorbs the lubricant and stays slippery. Don't skip this part, because most tuning stability issues are caused by friction, not the tuners.

Well, if you've made it this far, then you'll have evaluated and cleaned your Strat, straightened out any neck issues, balanced the vibrato, adjusted the saddle heights, put on new strings (properly) and set the intonation. Congratulations – you're done! Now it's time to stop fiddling about and go and play the bloody thing… *G*

1 Work your way all along the string and tune it back up to pitch when you finish. You will probably need to do this three or four times before the string stops stretching completely. Don't pull too hard, because strings snap easily. Try pressing firmly behind the nut to prevent the strings pulling off the posts

ESSENTIAL SKILLS 4

REPLACE A FAULTY POT

WORDS HUW PRICE

The telltale sound of a noisy pot bedevils every guitarist at some point or another. While simply squirting cleaner into a potentiometer is usually enough to cure your noise problems, sometimes pots are beyond saving. As well as being noisy, they can develop dead spots or can even seize up completely.

Even if your controls are working properly, you may want to experiment with different potentiometer values or tapers to fine-tune your tone or achieve a specific response. The transformative effect of a five-quid pot swap may even greatly exceed that of a costly pickup upgrade.

Control pots can usually be found under pickguards or your guitar's control cover plates. Identify the potentiometer you wish to change and make a note of the existing connections. You can do this by drawing a wiring diagram or taking a snapshot using your phone and then refer to it when it comes to reconnecting the wires – it could save you a headache later on.

Remove the control knob and take a hot soldering iron to the first solder tag on the pot. As soon as the solder has melted, pull the wire away from the pot using a pair of needle pliers. You can use your fingers instead, but sooner or later you'll burn them. Repeat the process until the potentiometer is disconnected completely from the circuit. Using larger pliers, unscrew the nut holding the potentiometer onto the body or the pickguard and remove the pot.

Fix the new potentiometer in position and solder the wires onto the solder tags, ensuring that the original connections are maintained. You may opt to wrap the exposed ends of the wires around the tags to achieve a secure mechanical fixing before soldering the joint. Once you're done, reassemble, tune up and you should be good to go. *G*

WHY YOU NEED THIS

Potentiometers get noisy and seize up; you wish to try a different value

WHAT YOU NEED

Pliers; soldering iron; solder; needle pliers

1 You can reach a Telecaster's electronics without removing the strings. They're mounted under a control plate held on by a screw at each end

2 The extension tube helps direct the contact cleaner to exactly where you need it

3 Before you disconnect the pot, draw a wiring diagram or take a photo to refer to when reconnecting the wires

4 Here's our new potentiometer, ready to be installed. Recessed grub screws secure Tele knobs to pot shafts, so we need solid shaft pots

5 Single-gang potentiometers have three solder tags. It's also common practice when doing this mod or repair to solder screed and ground wires to the pot casing

25 WAYS TO MOD YOUR TELECASTER

WORDS HUW PRICE

For some players, Leo's plank was perfect from the get-go. It also happens to be one of the best modding platforms in all of Guitardom. Here are 25 ways to transform your stock Tele…

In its purest form, the Fender Telecaster hasn't exactly put in a bad shift. With a starring role on more hit records than you could possibly count, the ultimate working-man's six-string electric is a near-80-year-old design that still feels, in so many ways, utterly contemporary.

Part of the genius of the Telecaster's design is that it's such a simple musical instrument to mass-produce, and it's this modular, bolt-together aspect of its construction that makes the Tele the perfect platform for tinkering, customising, modifying and upgrading. Whether you covet the mid-rich raunch of the early Broadcaster, the slicing treble of the 70s, that Bakersfield twang or something else entirely, it doesn't take a working knowledge of quantum mechanics to tweak your Tele and make it sound and play the way that you want it to.

Here, we present 25 tips that will help turn your guitar into a tone machine. Read on, and enjoy…

1 BETTER CONTROLS

Some players find the standard Telecaster switch less than ideal for speedy pickup changes. The volume knob gets in the way of the switch, especially with the earlier-style switch tip, and the angle isn't conducive for the right arm. Presumably, it explains why Fender changed to an angled switch when the Stratocaster was under development.

If the switch bugs you, consider getting a control plate with an angled switch slot from Rutters, RockRabbit or LsL Instruments. You could also check out slotless control plates that are drilled for toggle switches instead. Loads of Tele players like to perform volume and tone swells using their little finger to rotate the control knobs, but standard Tele knobs can get a bit slippery in the sweaty heat of a gig, and it's tricky if you have small hands.

The solution could be a set of 'heavy knurl' knobs. You can get them from various suppliers, but ensure they'll fit onto your pot shafts. Asian-made pot shafts tend to have a narrower diameter than US ones.

2 SQUEAL KILL

Microphonic feedback is an uncontrollable high-pitched squealing sound. Unless you're playing in an avant-garde New York noise band, it's probably not something you'll find particularly useful. Unfortunately, it happens with some Telecasters, particularly on the bridge pickup, and most people blame the metal base plate.

A couple of simple things may help; firstly, try swapping the spacer springs for 50s-style surgical tubing. You can also place some foam in the bottom of the pickup cavity; it has to be thick enough to press against the baseplate and dampen vibration, but not so thick that it prevents the height adjustment screws from doing their job. You can fix the foam in position with double-sided carpet tape.

ABOVE TOP Swapping spacer springs for surgical tubing may help eliminate feedback

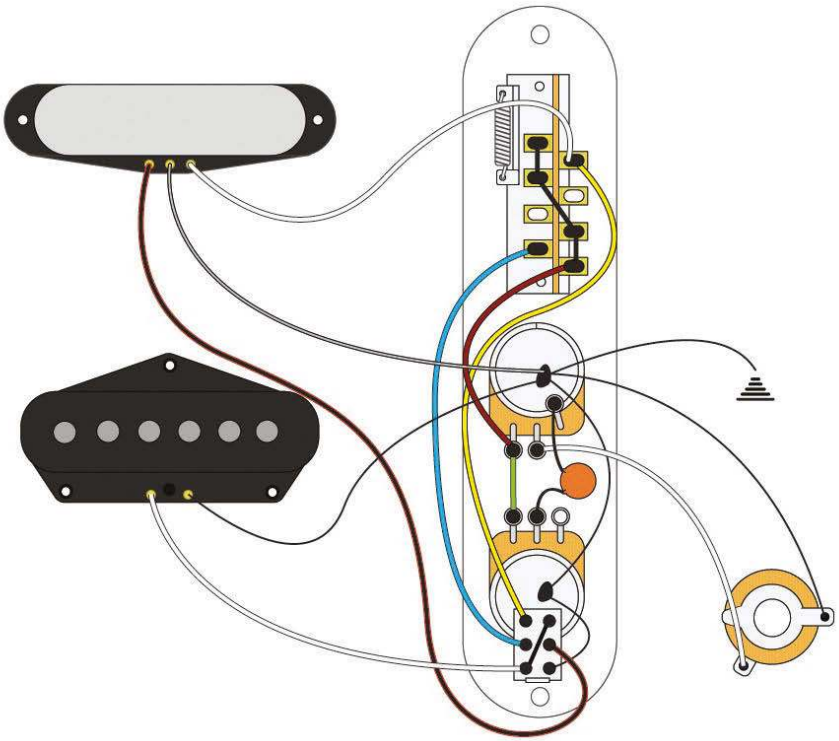
ABOVE Another useful approach is filling the cavity with foam

3 PARALLEL/SERIES SWITCHING

This mod allows you to get a fourth pickup combination from your Tele without swapping the three-way switch or changing the outward appearance. Putting hum-cancelling properties aside for a moment, humbucking pickups are essentially two single-coil pickups wired in series. Regular Teles have two single-coil pickups, so why not add a series switch? If you use a push-pull or push-push switching pot, it can be mounted in place of the stock volume or tone control, but most modders prefer to replace the tone pot because it's less susceptible to accidental

PARALLEL/SERIES SWITCHING CONJURES A FOURTH PICKUP COMBINATION FROM YOUR TELE WITHOUT SWAPPING THE THREE-WAY SWITCH OR CHANGING ITS LOOK

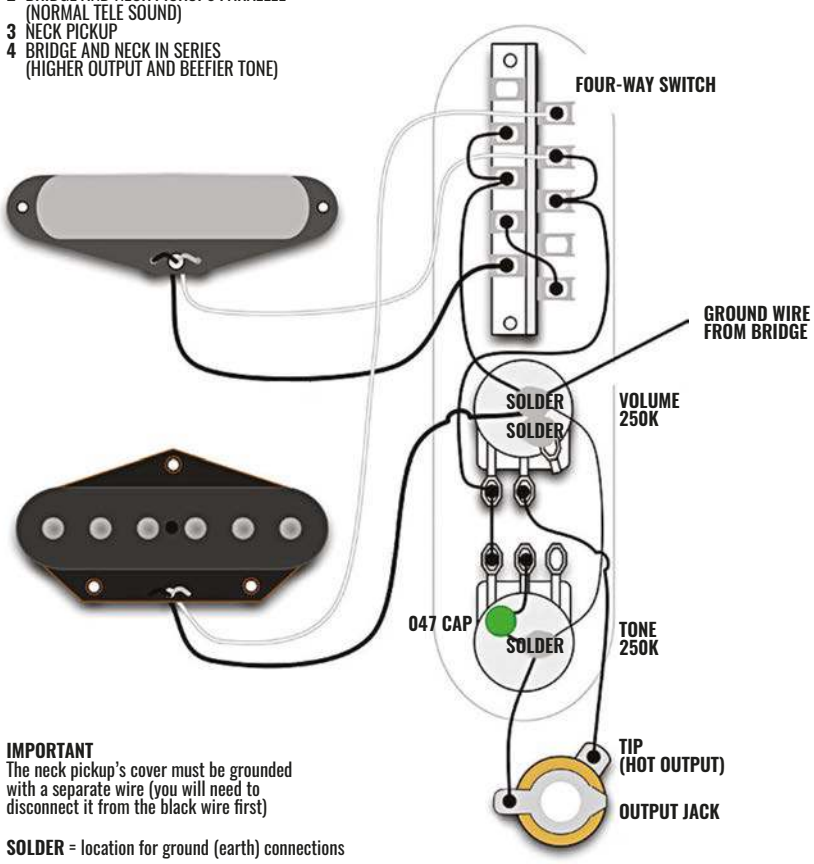
PUSH-PULL PARALLEL/SERIES SWITCHING



FOUR-WAY SWITCH FOR PARALLEL/SERIES SWITCHING

FOUR-WAY SWITCH SETTINGS

1 BRIDGE PICKUP
2 BRIDGE AND NECK PICKUPS PARALLEL (NORMAL TELE SOUND)
3 NECK PICKUP
4 BRIDGE AND NECK IN SERIES (HIGHER OUTPUT AND BEEFIER TONE)



IMPORTANT
The neck pickup's cover must be grounded with a separate wire (you will need to disconnect it from the black wire first)

SOLDER = location for ground (earth) connections

SLEEVE (GROUND)
This is the inner, circular portion of the jack

activation. The new switch selects series mode regardless of the position of the pickup switch, and when you deactivate series mode, the guitar returns to normal. It's a simple mod that increases output and thickens up the sound for those rockier moments.

4 CHANGE SADDLES FOR IMPROVED INTONATION

Fender's introduction of individually intonatable bridge saddles for the Stratocaster would seem to have been an acknowledgement that the original three-saddle Tele bridge was a bit of a compromise. Nowadays, it's easy enough to find six-saddle Tele bridges, and they're stock items on many contemporary T-types. Even so, many players prefer the traditional look, and some insist the three-saddle design produces superior tone.

Slanted saddles are commonplace, but they look clunky and the strings can foul against the height adjustment screws if the screws are too wide. Instead, try saddles with wedge-shaped staggered take-off points moulded in. Gotoh saddles have stealthy notches that guide the strings. They line up straight, maintaining a vintage appearance and even string spacing. Mastery Tele bridge saddles take the intonatable three-saddle approach as far as it can go, but the non-traditional looks will divide opinion.

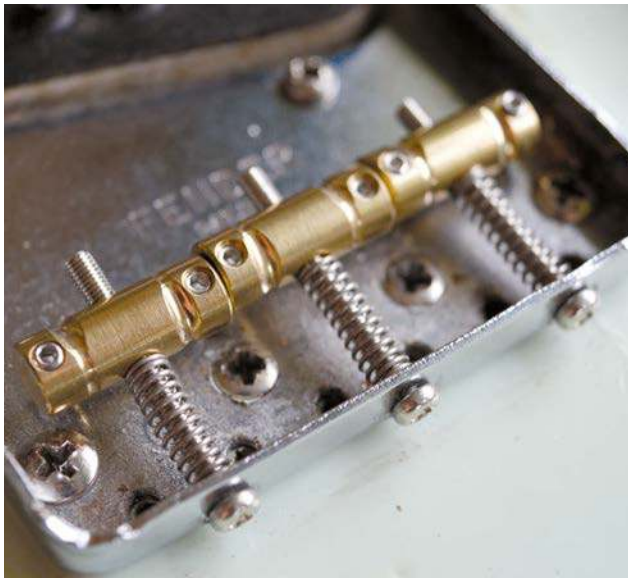
5 BRIDGE-PLATE UPGRADES

One of the most commonly voiced complaints about Telecasters is regarding the design of the bridge. It was originally intended to have a cover, and the folded sides were there for the cover to grab on to. Nobody uses the cover these days and many players find that the sides restrict access to the strings. You can get Tele bridges with lowered sides or no sides at all, while others, such as Barden and Callaham bridges, have the treble-side scoop favoured by Danny Gatton.

Many players also debate the merits of vintage-style thin, cold-rolled steel for twang, or thicker steel and brass for sustain. You can even get aluminium bridges. Some also claim that squeal can be reduced if the base of the bridge is perfectly flat and smooth. Alternatively, you could 'go commando' with a chopped bridge and screw the bridge pickup straight onto the body – just as Fender did with the GE Smith signature model.

6 CHANGE SADDLES TO IMPROVE TONE

Even in the pre-CBS era, Fender experimented with various saddles. Starting out with 1/4-inch cold-rolled steel, it moved to brass for the Broadcaster. Around 1954, the company went back to steel, this time with string guide grooves, before settling on threaded steel saddles. Tele aficionados will say they all sound different, and the consensus is brass has a smoother, richer tone but steel has a brighter, snappier attack with more growl. Other materials



include titanium, stainless steel and aluminium. Aluminium saddles are particularly popular, and some find they give the bright 'acoustic' quality of steel without sacrificing the thickness and body of brass. Other players, such as Brad Paisley, prefer to combine brass on the high strings with steel for the sixth and fifth (E and A) strings to enhance snap and twang. It's down to what works for your guitar. Steel or aluminium may benefit a naturally dark guitar and brass may soften excessively bright pickups.

7 BRIDGE PICKUP UPGRADES

It's fair to say that some players like the idea of a Telecaster more than the actuality. That's not a problem, because a bewildering array of replacement pickup options allow you to combine the Tele's utilitarian looks and functionality with any tone you want.

While retaining the stock bridge, you could try a Seymour Duncan Little '59 for a PAF-like humbucker tone. Or what about a P-90 soundalike from The Creamery, Harmonic Design or Lindy Fralin? Vintage Vibe and Lollar make Charlie Christian-inspired bridge pickups and TV Jones has just introduced a DeArmond-inspired Tele set. If you want to take it even further, replacement bridges are available with full-sized PAF and Filter'Tron cutouts.

8 NECK PICKUP UPGRADES

Even Telecaster die-hards will sometimes admit that the stock neck pickup is not the model's crowning glory. By the mid 50s, players had already begun swapping them out and some of the most iconic and historically important Telecasters of all time, such as Keith Richards' Micawber and Albert Collins' Custom, had humbuckers in the neck.

Given the size constraints of the vintage-style pickup rout, drop-in replacements are relatively hard to find. Even so, you could consider the TV Jones T-Style for some DeArmond flavour, the McNelly T-Bar for P-90 tones or the Vintage Vibe VT-N-BL for Charlie Christian jazziness. For rock and metal sounds, look no further than the Seymour Duncan Hot Rails.

Many modern Teles have oversized routs so you can install any pickup you like without having to cut wood; in which case, it's game on. If you can imagine it, you can bet someone else has tried it. All the usual suspects are proven performers, but adventurous types might be interested in more authentic Charlie

OPPOSITE TOP The wiring diagram for push-pull parallel switching

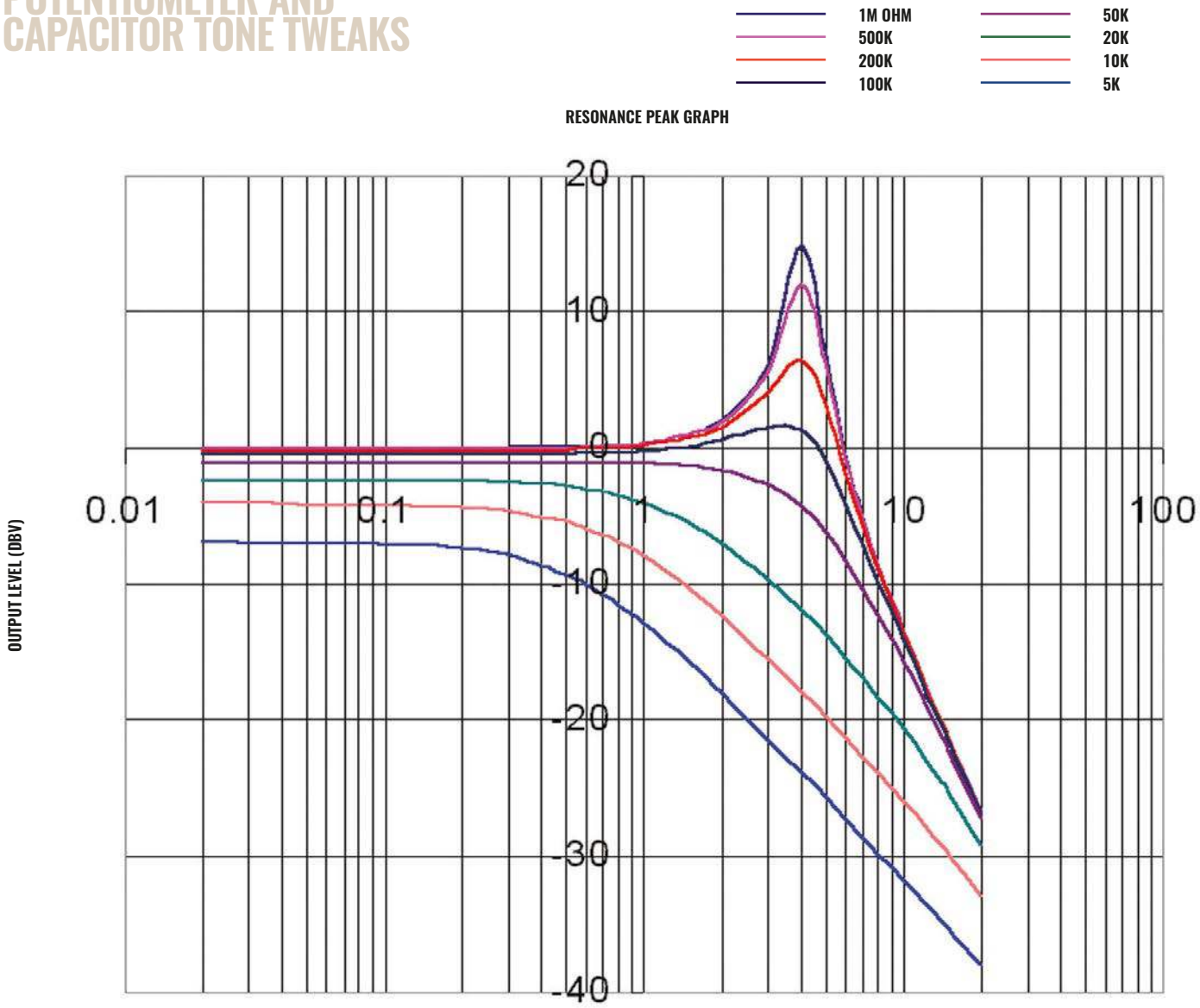
OPPOSITE BOTTOM The schematic for four-way parallel switching

ABOVE LEFT Slanted saddles can cause string problems

ABOVE TOP Gotoh saddles have notches for the strings to sit in

ABOVE Some Tele players prefer a mixture of steel and brass saddles

POTENTIOMETER AND CAPACITOR TONE TWEAKS



OPPOSITE TOP A Bigsby B5 kit fitted to a mid-90s Mexican Tele

OPPOSITE MIDDLE 50s tone-pot wiring

OPPOSITE BOTTOM Marking the screw-hole positions for a Stratocaster-style neck-pickup adjustment

Christians from the likes of Lollar, Firebird-style mini humbuckers or a Gold Foil repro from Mojo Pickups.

9 POTENTIOMETER AND CAPACITOR TONE TWEAKS

If you're looking for subtle tone tweaks rather than sonic transformation, experimenting with control pot values is more cost-effective than swapping pickups. Although Fender used 1m pots for a while, 250k is the standard value for Telecaster potentiometers.

It's commonly held that higher-value volume pots make a guitar sound brighter, which is sort of correct. Conventional guitar circuits have inherent treble roll-off; and pickup inductance, pot resistance and cable capacitance combine to create a resonance peak at the cut-off frequency.

Higher-resistance pots accentuate that resonance peak, which happens to be in the treble region with Telecasters. With hot humbuckers, you'll get more of an upper-midrange boost.

The earliest Stratocasters had 100k pots, and they sound very smooth but less shimmery. Few will want to brighten up a vintage-spec Tele, but a 500k or 1m volume pot may drag a tad more twang out of a hot-wound Tele set.

You may want to mess with your tone control, too. Tele types often feel compelled to imitate truck horns and train whistles. Wah effects are popular, too. In addition to pot values, you can experiment with a linear taper to alter the control response or try different capacitor values.

The stock cap is 0.047uF, but 0.022uF will make your Tele sound brighter and 0.068uF and 0.1uF will make it sound darker. The capacitor value will also alter the range of the tone control, so consider hooking up a bunch of capacitors to a rotary switch to decide which value works best for you.

10 BIGSBY CONVERSION

For many, the Telecaster's structural solidity is a big part of its allure, but there's no denying the model looks fabulous fitted with a Bigsby. There are plenty of options to choose from and much depends on whether you are prepared to drill extra holes in your guitar. If you're not, the only option is the Vibramate system, which comes with a specially adapted bridge and a Bibsby mounting plate that is anchored by the strap-button screw.

The Bigsby B5 kit also comes with a new bridge plate and a rocking bridge with six adjustable saddles.

The Bigsby itself has a front roller bar and it's screwed onto the top of the guitar. You also need to drill wide holes for the new bridge posts.

For a full-on vintage vibe, check out the Bigsby B16 kit. Originally introduced in 1953, this massive casting replaces the original bridge and raises the bridge pickup height. Two holes have to be drilled behind the bridge pickup, with two more above the strap button, but there's no need to drill for bridge posts. The kit comes with a 3/16-inch neck shim that creates a back angle. This increases the break angle over the bridge so there's no need for a front roller bar. Users report that the B16 has a wider range than the other Bigsby solutions, but the guitar will feel slightly different to play.

11 NECK PICKUP BRIGHTNESS MOD

Some Tele neck pickups sound duller than others, and many Tele players never bother using them at all. Before resorting to a brighter-sounding replacement or, worse still, routing out the body and cutting a larger hole in the pickguard for a different pickup, try this simple mod.

The metal covers on traditional Tele neck pickups have much the same effect as PAF covers. To unleash the full frequency potential of Tele neck pickups, just snip the cover's grounding connection. The downside is that you'll experience a bit of noise if you touch the cover, but that's easy to avoid, and the extra brightness and transparency might persuade you to reconsider that pickup upgrade.

12 50S TONE-POT WIRING

One of the lesser-known quirks of 1950s Gibson guitars was the way the controls were wired up. The tone circuit was connected to the output of the volume control rather than the input, which maintains clarity when you turn down the volume control. Teles are naturally bright guitars, so a treble bleed capacitor over the volume control can thin out the tone excessively when you turn down.

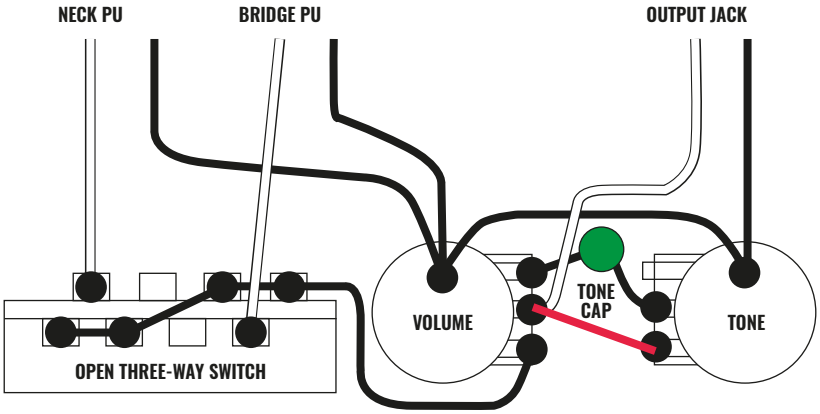
Instead, try Gibson-style wiring and move the wire connecting the tone control to the volume control from the outside solder tag of the volume pot to the centre tag. That's really all there is to it. If you don't like the results, this mod is easily reversed.

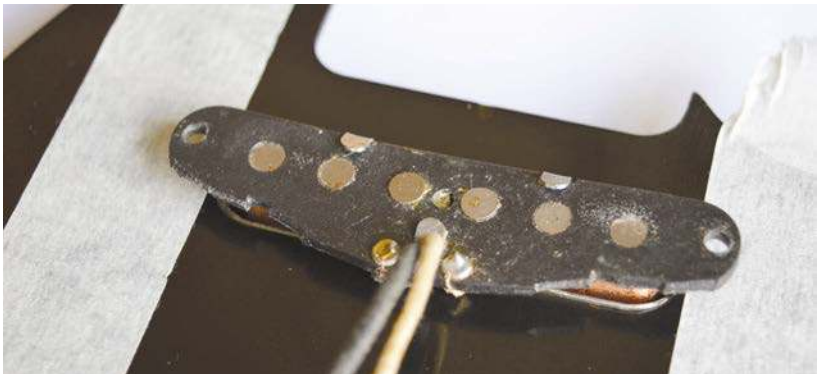
13 STRAT-STYLE ADJUSTMENT

Traditionally, Tele neck pickups have been screwed directly onto the body. This means you are obliged to remove the pickguard in order to make adjustments to the pickup height. By and large, removing the pickguard isn't a huge inconvenience; however, it's not possible when you're dealing with a 22-fret neck with a fingerboard extension.

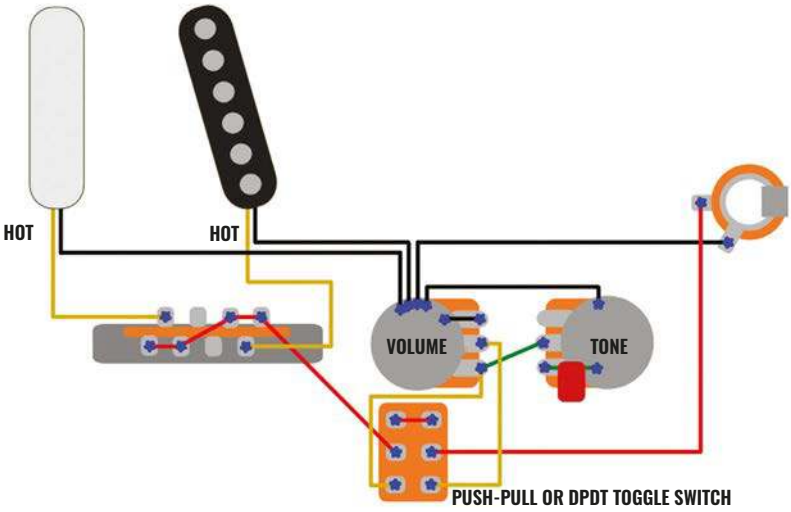
The solution is to drill screw holes into the pickguard so you can mount the neck pickup Strat-style. Fix pieces of masking tape at each end of the pickup hole, flip the pickup over and drop it through

50S TONE POT WIRING





DIRECT-OUTPUT MOD



ABOVE The wiring diagram for the direct-output mod (see Tip 15)

ABOVE BOTTOM An infamous Fender retainer clip (see Tip 16)

the hole in the pickguard. With a sharp pencil or pen, you can mark the position of the pickup's screw holes onto the masking tape and drill through with an appropriate-sized bit. You'll need new screws that will bite into the pickups bottom-flat, but you should be able to reuse the spring or tube spacers.

14 FIT A TOP LOADER

We promise this has nothing to do with washing machines. For a brief period in the late 1950s, Fender ceased through-body stringing on Telecasters and installed bridges with six holes drilled through the back lip. Strings were threaded through the bridge plate instead of the body, and many players feel that Teles with these 'top loader' bridges have a different sound. The most famous exponents are both called Jim – Page and Campilongo.

Detractors claim that top loading reduces sustain, but fans point to enhanced twang, more bite and a ringing chime. Top loading is also said to provide a more slinky feel – much like dropping down half a string gauge. You can buy top-loading bridges, or simply convert a regular bridge by drilling six holes in the back. You could try through-body stringing the top strings for thickness and top loading the wound strings for twang – or do the opposite for solid lows with easier bends.

15 DIRECT-OUTPUT MOD

Fender chose 250k pots because they roll off some of the top end. After all, Telecasters are naturally bright guitars and the original ash bodies and chunky maple necks didn't do anything to tame the treble. Even so, the direct output mod has gained favour with country pickers, who often want brighter and more dynamic tone. Rock players might like it too, especially with darker-sounding overwound pickups, because you get an even higher output level.

This mod involves adding a switch to bypass the volume and tone controls, and routing the output of the pickups directly to the output jack. You can mount a mini toggle switch on the control plate between the two knobs or use a push/pull switch. Alternatively, you can fit 'no load' potentiometers that click into bypass mode. This would allow you to re-engage the controls individually or together. In a sense, it harks back to the original Esquire wiring, where position one disengaged the tone control, or you could equate it to a pedal's true-bypass switch.

16 SCREW-IN JACK SOCKET

If you have a vintage-style output jack cup and it has never become loose and wobbly, you can consider yourself lucky. The originals have a retainer clip that spreads out to grip the wood as the socket nut is tightened. To do the job of tightening it properly, you need to rig up a contraption with bolts, washers and nuts, or buy a specialised tool from Stewart-MacDonald.

Instead, do yourself a favour and buy a screw-in cup. It pushes straight into the hole, two small screws go in on the diagonal to hold it in position and that's about it. The cup will never get loose, but you can take it in and out at will. Would Leo have considered this an improvement? Almost certainly.

17 NASHVILLE MOD

The biggest problem for Fender fans is choosing between Strats and Teles. Understandably, players sometimes want and need the best of both worlds. Although Lowell George installed a Tele bridge pickup in his Strat, it's more common for players to put a Strat pickup in the middle position of a Tele, along with a five-way switch. The Fender Nashville Telecaster is an off-the-shelf Tele/Strat hybrid with an added Strat middle pickup. Some players take things further, with a Strat pickup in the neck position, too. Of course, that will involve even more routing with vintage-spec bodies, but if you're routing for a middle pickup anyhow, that hardly matters.

18 ELECTRONICS UPGRADES

Some perfectly good Telecasters are let down by low-quality electronic components. The necks and

bodies may be just fine, the hardware is generally functional and the finish may be really good. But if you look under the control plate, you might find cheap mini potentiometers and dodgy plastic-cased switches. For relatively low cost, you can upgrade to an Oak Grigsby switch and a pair of CTS control potentiometers. After 30 minutes or so of soldering, your budget Tele will be packing controls that are identical to those used on top-of-the-line Custom Shop models. Simply download a schematic for Telecaster wiring and follow the diagram.

19 TRY A STRING BENDER

Players were using Telecasters to mimic pedal-steel guitars from the get-go, but a certain country virtuoso named Clarence teamed up with his Byrds band-mate Gene Parsons to move the goalposts forever. The Parsons White StringBender is a mechanical device that's installed in a chamber routed into the back of the body.

The lever mechanism is attached to the guitar strap and it's operated by pulling down on the neck to bend the second (B) string up by a preset amount. This allows players to bend the second (B) string up a whole tone while holding chords. Later, Parsons designed the Parsons Green system and the Hipshot B-bender.

In addition to bending with the strap button, you can use levers behind the bridge, or even operate a lever using your hip. Hipshot also makes toggle levers to alter the tunings of individual strings, and the Doubleshot which changes the tuning of all six strings simultaneously – so you can go from standard tuning to open G at the flick of a lever.

20 FIT A TONESHAPER TS-T2-SS

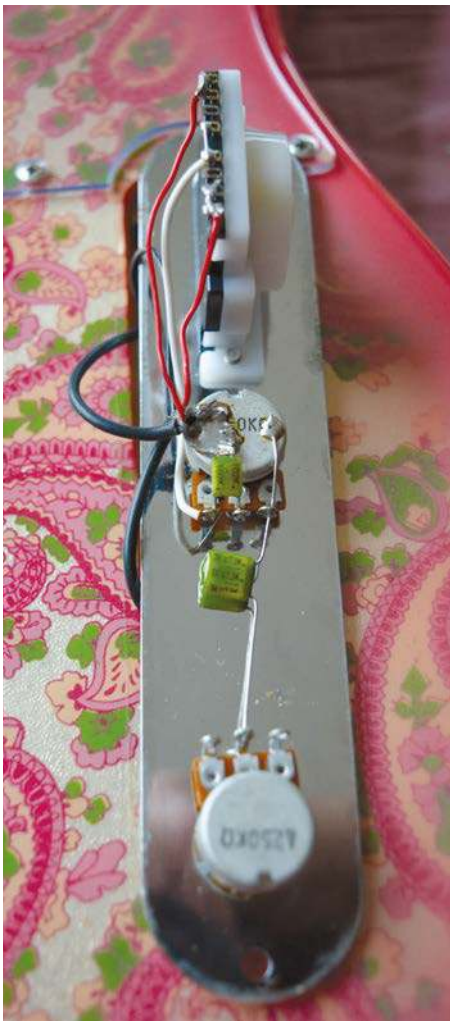
This could be the ultimate in Tele wiring trickery. Most of the wiring mods we have discussed elsewhere in this feature are included in a switchable format on the ToneShaper. CTS control pots and an Oak Grigsby switch are mounted on a PCB that can be bolted onto the back of a regular control plate. All the pickup and output connections are push fit, so no soldering is required and you can simply plug in a three-, four- or five-way switch. They're all compatible.

Three banks of mini switches allow you to toggle the value of the volume pot from 250K to 500K to brighten the tone. You can also switch a treble-bleed resistor/capacitor network in or out. Four surface-mount tone capacitors are attached to the PCB; the switching allows you to use them individually or in combination, enabling you to choose between 15 different values. It's surely the ultimate birthday gift for any obsessive Tele twanger.

21 SWAP YOUR NECK TO CHANGE YOUR TONE

When guitarists talk about neck preferences, most think in terms of feel and playability. That's perfectly understandable, but few stop to consider how neck thickness and mass affect this most 'acoustic' of all solidbody electric guitars. The common perception is that rosewood fingerboards warmed up the Tele tone compared to the earlier one-piece maple necks. However, it's worth remembering that Fender was changing the way pickups were being made and swapping over to alder bodies and steel saddles at the same time.

The proof comes when you swap between two identically made necks while retaining the same tuners, body, pickups and strings. Having tried this, we can report that the difference can be profound. As far as one-piece maple necks are concerned, we would associate them with clear definition, enhanced sustain and tonal brightness. A slimmer but otherwise identical neck will produce a woodier, warmer and slightly mellower tone. Ultimately, neck size is just one of many variables that influence sound and

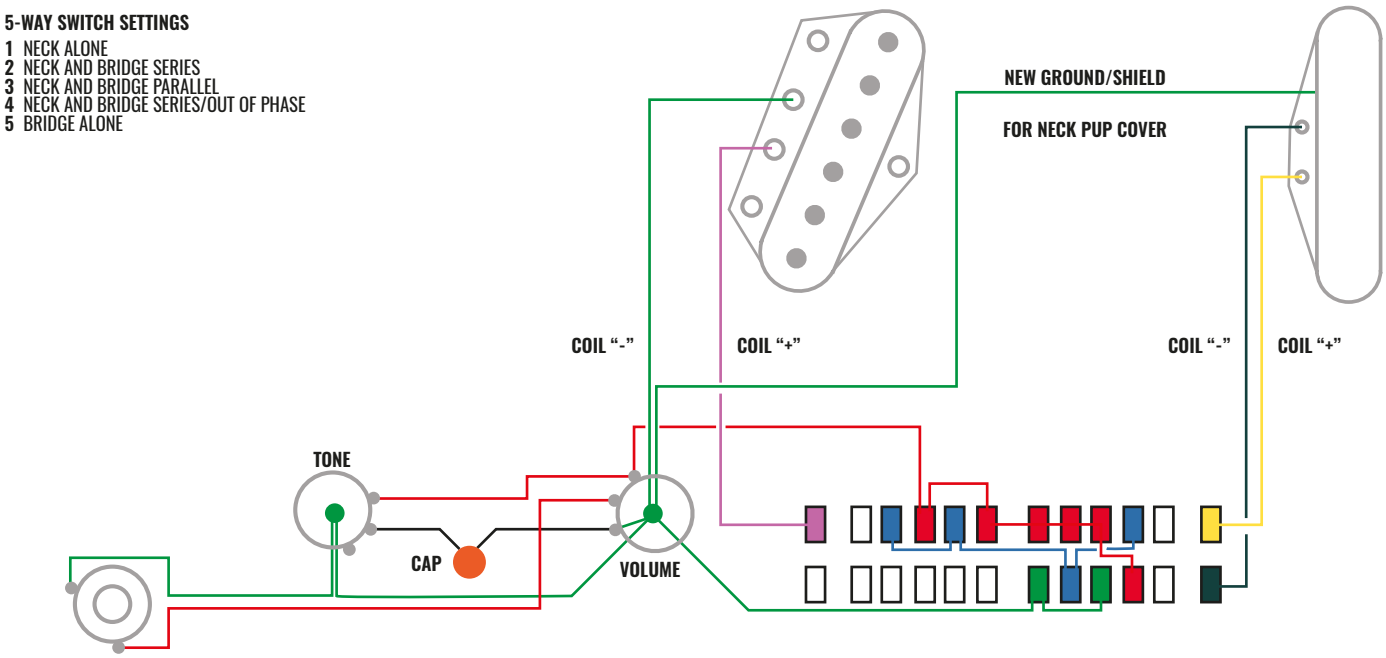


THE DOUBLESHOT STRING BENDER CHANGES THE TUNING OF ALL SIX STRINGS SIMULTANEOUSLY – SO YOU CAN GO FROM STANDARD TUNING TO OPEN G AT THE FLICK OF A LEVER

ABOVE LEFT This guitar could benefit from a component upgrade

ABOVE RIGHT High-grade components installed

FIVE-WAY 'SUPER SWITCH'



THIS IS TYPICAL WIRING FOR A TELE CONTROL PLATE, FLIPPED OVER AND SEEN FROM THE BOTTOM

ABOVE The schematic for the five-way 'Super Switch' mod (see Tip 22)

sustain characteristics, but it's worth considering nevertheless.

22 INSTALL A FIVE-WAY 'SUPER SWITCH'

We have already discussed the series switching mod for getting humbucker-style sounds from a regular two-pickup Tele using push/pull switches or a four-way switch.

However, you could also consider the five-way 'Super Switch' for even more tone options. The 'Super Switch' is unlike a regular five-way Strat switch. This one has two wafers, each loaded with 12 solder tags that are grouped in two batches of six.

So that's 24 solder tags in total. Installed in a Tele, the 'Super Switch' gives you the three regular Tele tones and the series combination, plus neck and bridge in series but out of phase. The out-of-phase tone is thinner and scratchier with a hollowed-out Peter Green sort of tone.

23 SPINNING THE CONTROL PLATE

It may be hard for some people to believe, but player dissatisfaction with the traditional Tele control plate inspired Fender to rethink the control layout when the Strat was being designed. Players wanted the volume control closer to hand for pedal-steel volume swells and quick level adjustments. Others found the switch placement meant it was frequently knocked accidentally.

Spinning the control plate around is one of the first modifications Tele players figured out. It puts the volume and tone controls within easy reach and moves the selector switch safely out of the way.

If you try this, remember to swap over the volume and tone potentiometers and flip the switch around, otherwise everything will work backwards. This is the favoured configuration for the King Of Dieselbilly – Mr Bill Kirchen.

24 LEATHER JACKETS AND ENGRAVED ACCESSORIES

We wouldn't dream of suggesting country music is kitsch, but nothing in the guitar world says 'outlaw cred' like a Telecaster in a hand-tooled leather jacket. Waylon Jennings blazed the trail that many have followed, and you can get one just like Waylon's from Mosby Guitars or 4E Custom Guitars, or go for something more individual from El Dorado.

If funds won't stretch that far, what about a tooled leather pickguard or control cover instead? There are plenty to choose from on eBay, and for a swampy blues vibe you could go for faux alligator. If leather isn't your thing, check out El Dorado's selection of engraved parts. If it's metal, the company can engrave it, although it sensibly stops short of strap buttons and jack cups.

25 TUNER UPGRADE

Die-cast tuners can make a light-bodied Tele a bit neck-heavy, so swapping them out for a set of vintage-style Kluson lookalikes can improve the cosmetics and feel. You will need a set of conversion bushes to fill out the wide post holes, but with luck the tuners will cover up any unused screw holes. If you're not dead set on having the Kluson stamp, we think Gotohs from a supplier such as Allparts UK are the smoothest and most stable.

Alternatively, you may prefer to modernise with die-cast tuners. Also consider staggered post heights because you might be able to get away without using string trees. That will reduce friction and allow for easier behind-the-nut string bending tricks.

If you play in drop D tuning, what about a Hipshot GT2 Guitar Xtender tuner? One of these will enable you to de-tune the sixth (low E) string instantaneously using a lever – and returning to standard tuning is just as fast. ***G***

Fender
ESQUIRE
Fender
Telecaster and Esquire Guitars
INSTRUCTION MANUAL
Fender SALES, INC.

ESSENTIAL SKILLS 5

CLEAN AND CONDITION YOUR FRETBOARD

WORDS HUW PRICE

The following advice applies only to guitars with bare-wood fingerboards. Finish usually protects maple 'boards, but rosewood and ebony fingerboards soon gunge up with dirt, finger grease, dead skin, food residue, blood and the general detritus of any guitar player's life.

In this era of relics, many players actually find the cruddy look appealing. However, if you prefer to live without the urge to wash your hands every time you play, a simple clean-up procedure will improve the feel of your guitar.

You'll also find that the crud doesn't get into your string windings, so they'll last longer – and a clean fingerboard feels faster and slicker to play. Lighter fluid is a liquid known as naphtha and it's a very gentle and effective guitar cleaner. After removing your strings, squirt some naphtha onto a folded piece of kitchen paper and begin rubbing the fingerboard. You'll soon see the dirt coming off onto the paper, and every so often you should change to a fresh area of paper.

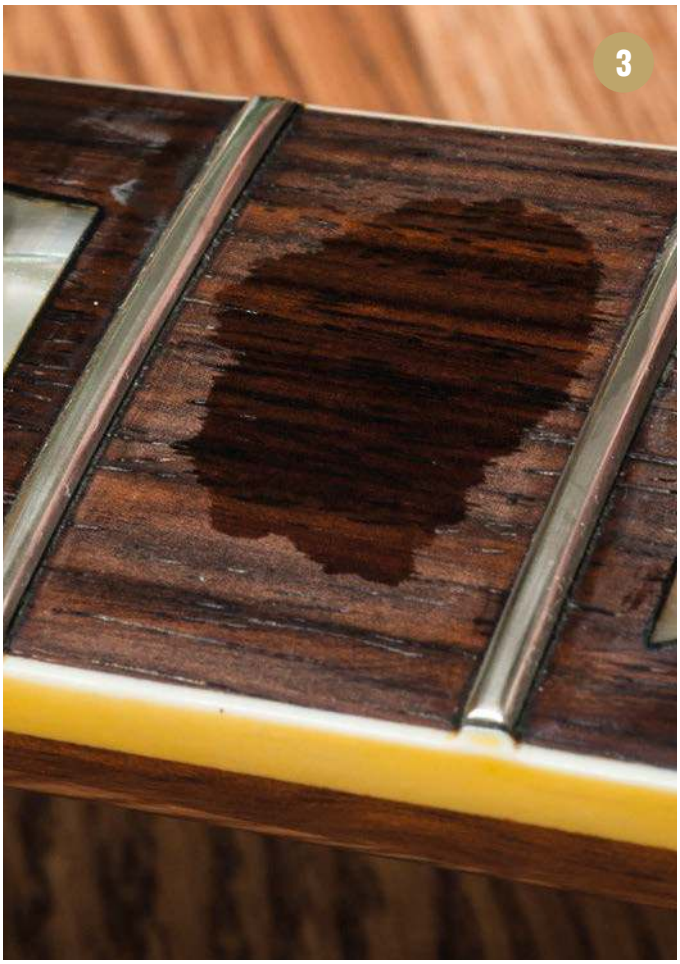
Work on one fret at a time and eventually you'll succeed in getting all that dirt off. If the 'board appears dry and dull, try applying some fingerboard conditioner or lemon oil. Allow it to soak in for 10 minutes or so, wipe off any excess with a paper towel and buff up the board with a clean cotton cloth before re-stringing. This is something you might consider doing once or twice a year, depending on how much the guitar is being played. *G*

WHY YOU NEED THIS

Fingerboards dry out; the dirt shortens string life; it's unhygienic and looks horrible

WHAT YOU NEED

Naphtha; fingerboard oil; kitchen paper



1 This fingerboard isn't too bad, but you can see dirt beginning to build up

2 A naphtha-soaked piece of kitchen paper gently lifts the dirt off the fingerboard, but leaves the wood looking a bit dry

3 Next, apply a dab of fingerboard conditioner or lemon oil to the 'board

4 Spread out the oil with your finger, working it up to the edges of the frets, and allow it to soak in

5 At the end of this procedure, the 'board looks clean and the wood grain pops with a deep colour

26 ESSENTIAL OFFSET GUITAR MODS

Our essential tips for squeezing every last drop of performance out of your Jazzmaster, Jaguar or other offset guitar – covering everything from new bridges and pickups to vibrato fixes and supercharged electronics…

WORDS MICHAEL JAMES ADAMS

ABOVE As this in-depth tips feature demonstrates, Fender's offset models are prime platforms for modifications and improvements

FACING PAGE From string mutes to a new vibrato unit design, a fresh approach to circuitry and a body shape optimised for player comfort, Fender crammed endless innovations into the Jaguar and Jazzmaster

Jazzmasters and Jaguars – and the many similar offset-bodied guitars they inspired – are tailor-made for modding. Not only do the players who gravitate toward them tend to be experimental types, the guitars' design begs for personalisation. Everything from hardware replacement to retrofitting non-standard pickups is par for the course in the world of offsets.

Here, we share some of our favourite alterations for these two great Fender instruments. Treat this article as a primer for your own ideas. And trust us, there are many more where these came from…

THE BASICS

1 STRINGS

Given that Leo Fender originally meant for these guitars to be used with the heavy-gauge flatwound strings of the day, installing a set of 0.011-0.048 or above will vastly improve the feel and response of your floating-bridge instrument. Tuning will be more stable, the vibrato will feel smoother, and the tone will rise like proving dough.

It's also a good idea to solder the finish wraps of your plain strings for extra durability in the event that they come into contact with the pivot-plate screws directly beneath them.

2 NUT

A properly cut nut is the first line of defence against pesky tuning problems. Even on a significant proportion of brand-new guitars, factory-stock nuts aren't necessarily slotted and seated properly. Have a luthier cut and shape a fresh one specifically for your instrument and string gauge and you'll find that your guitar sounds and stays in tune better.

We recommend unbleached bone, brought to a high polish, for its hardness and beauty, but Tusq will suffice for those with a vegan lifestyle.

3 NECK PITCH

If you've ever looked at a Jazzmaster from the side, you'll see a solidbody guitar with the string geometry of an archtop; the strings flow from tailpiece to floating bridge, and then down an angled neck that rises off the body to meet them. Increasing the angle of the neck in relation to the body is the best way to get your guitar playing and feeling solid.

Fender accomplished this by using thin shims in the neck pocket, although a thin business card laid flat at the pickguard side of the neck pocket works just as well. Otherwise, full-size shims are available from guitar-part providers such as StewMac.

When you're happy with the amount of lift you've achieved, you can raise the bridge and pickups to compensate. With just a bit of maintenance, you can keep your stock bridge and stop worrying about skipping strings and poor intonation.

4 FLOPPY VIBRATO-ARM FIX

We call this the 'Hammer Trick'. A drop-in vibrato arm that won't stay put is a symptom of a poor fit between the arm and its collet. To remedy this, you'll need a vice and a hammer. Place the arm in the vice with about an inch of the inserted end poking out,

then give it a good whack with a hammer. This will slightly bend the end of the arm, forcing contact with the sides of the collet. If it's still loose, perform the manoeuvre again; if it's too tight, turn the arm around in the vice and smack it from the other side.

NOTE This will only work with US-made instruments with the push-in arm.

5 LUBRICATION

Friction is the enemy of tuning stability, and lubricating each point of friction in the strings' path will encourage them to return to pitch. There are various products on the market for this issue, but we found the humble tube of lip balm works, too – it's perfect for bridge saddles and nut slots. You'll only need a small amount of the stuff to keep your whammy-bar embellishments in line.

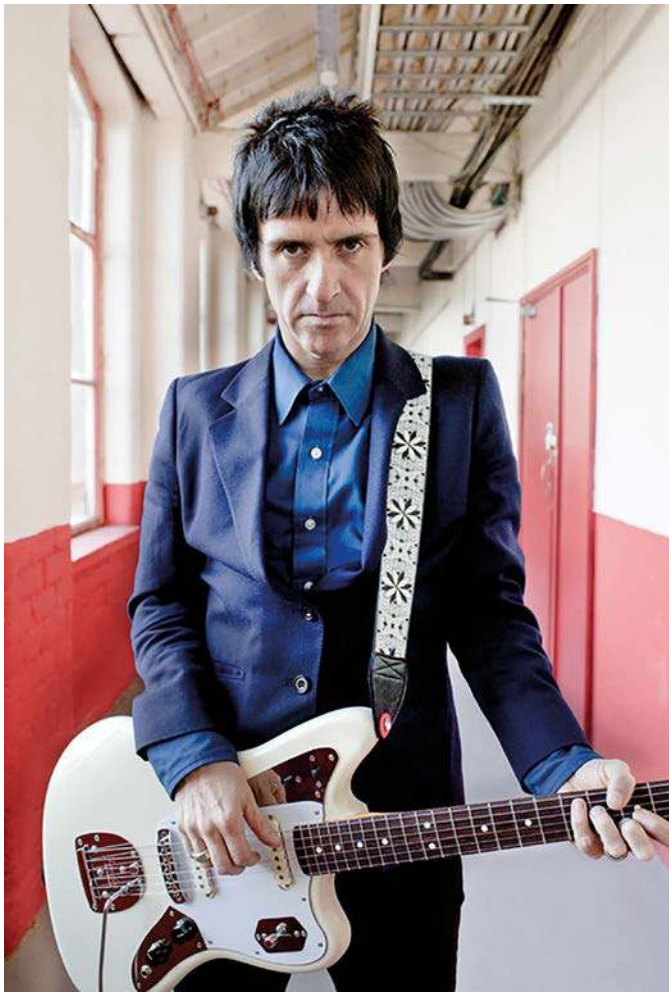
HARDWARE

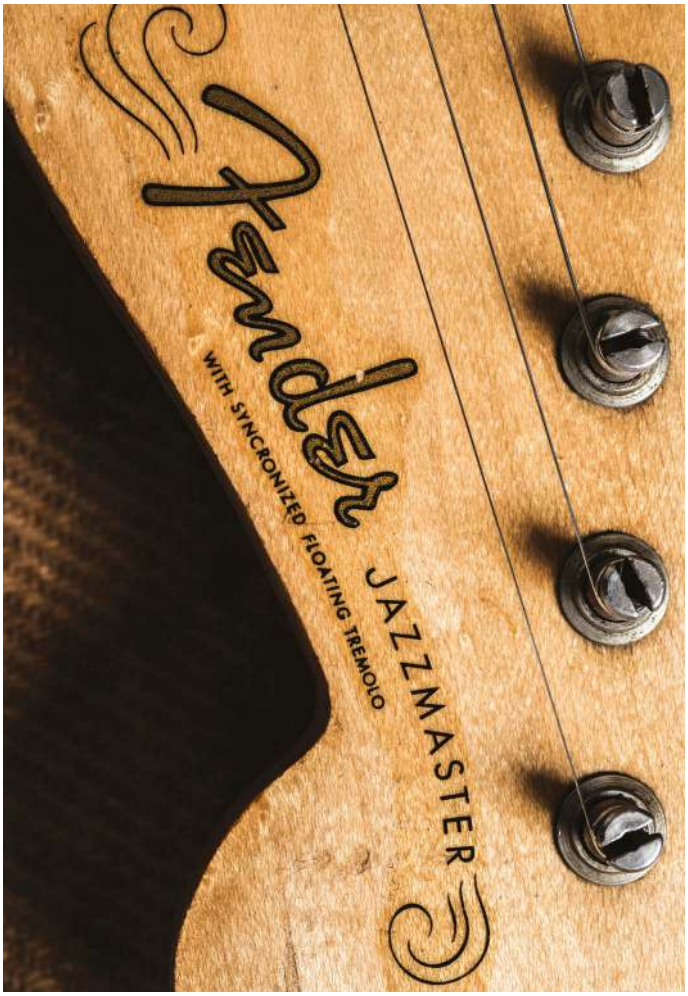
Perhaps the most popular modification for offset Fenders is replacing the stock bridge with a more robust aftermarket part. Although a correct setup will make any Jazzmaster or Jaguar play dependably, we recognise that not everyone has the time or the ability to go to such great lengths. Many simply choose to change the bridge.

Chief among the many companies that design bridges are the US-based Mastery Bridge and UK-based Staytrem. Both have their adherents and detractors, so it's important to weigh the pros and cons of each bridge separately.

6 STAYTREM BRIDGE

If you like the original bridge, but want something more dependable, the Staytrem is a good and affordable option at £65. Best understood as a heavily upgraded Mustang-style bridge, this bridge features





six individually adjustable barrel saddles with a deep, centred groove to keep strings in place. It boasts nylon inserts on the saddle screws; this keeps bridge height stable and reduces the stock Fender design's tendency to rattle. The bridge is available in both 7.25- and 9.5-inch radii to match the curvature of your guitar's fretboard, and there's even a wider bridge meant for Bass VI models.

However, this bridge is meant to rock with trem use, which certain players may find problematic. Additionally, the fixed radius makes setups tricky for guitars with flatter fretboards. Some opt for a generic Mustang bridge, but if you're going to go down that route, just spend the extra money on the Staytrem.

7 MASTERY BRIDGE

Players who want a bridge that improves sustain and remains stationary with heavy vibrato use should consider the Mastery bridge – even though, at $175, it doesn't come cheap. Designed and manufactured by Minneapolis luthier John Woodland, this is an overbuilt masterpiece of guitar hardware. It's machined and formed from stainless steel, and has oversized bridge posts that lock in with the guitar's body inserts to increase resonance and fix the bridge in a stationary position.The gently radiused, twin brass saddles have a proprietary hard chrome plating and deeply grooved, V-shaped channels to keep strings put. Intonation is adjustable via two Allen screws for each saddle. Although some feel that the Mastery's enhanced resonance is antithetical to the classic offset sound, player needs are paramount.

IF YOU HAVE A GOOD VIBRATO BUT CAN'T STAND DEALING WITH THE ARM FALLING OUT, STAYTREM OFFERS A REVAMPED ARM AND COLLET SET – FOR JUST £30

8 THE TUNE-O-MATIC BRIDGE

A fairly common mod that can cause more problems than necessary, installing them usually requires drilling out the body to accept new inserts. There's also the radius mismatch between the 12-inch-radius bridge and most Fender-style necks. This makes it difficult to achieve a consistent action across the 'board. The shape of the saddles on these bridges can also prove problematic for those who use the vibrato frequently, although this can be mitigated with lubrication and additional filing of the grooves.

VIBRATO

There's little reason to swap the tailpieces of vintage and US-made reissues, but with the following upgrades, owners of Japan-made Fenders and Squiers will see improvements in tuning stability and feel…

ABOVE The Offset Mastery Bridge, released in 2008, helps to eliminate the buzzing and string movement that plagued the bridges of original Fender offset models

FACING PAGE Johnny Marr's signature Jaguar, released a half-century on from the original, refined the instrument for modern purposes and lovingly tweaked the design

9 VINTAGE FENDER VIBRATO UNITS

These are coveted by in-the-know players for the taut response of the original carbon-steel spring. Earlier 'Pat Pend' vibratos are especially favoured for their stiffer, smoother feel and they stand up far better to bends and detuning than modern recreations. These units will often fetch well over $200 on the used market, though.

10 MASTERY VIBRATO

The Mastery feels almost identical to early trems, and can be had for around $180. But it shouldn't be thought of as a mere reproduction of those traditional bridges. A rugged affair made from stainless steel with countersunk screws, this modern-meets-vintage vibrato features an updated string anchor plate, an arm with user-adjustable swing, and, best of all, a painstaking recreation of the carbon-steel spring.

11 AMERICAN VINTAGE REISSUE

This is the same part as used on the AVRI '62, AV65 and American Original guitars – for guitars imported from outside the US, they're excellent choices. Price-wise, they sit between $70 to $90, which makes them an ideal upgrade for modders on a tighter budget.

12 STAYTREM VIBRATO ARM

If you have a good vibrato but can't stand dealing with the arm falling out, Staytrem offers a revamped arm and collet set – for £30 – that retrofits most existing tremolo systems and eliminates the woes of an untamable arm.

13 FACTION GUITARS HARD-TAIL PLATE

For a no-nonsense option that's all rock and no roll, consider a hard-tail plate from Faction Guitars. These custom-machined stainless-steel plates install quickly using the same mounting holes as the stock vibrato, enabling you to string your guitar using six keyhole anchors. A huge range of control plates is available, retailing from $45 to $80.

WIRING

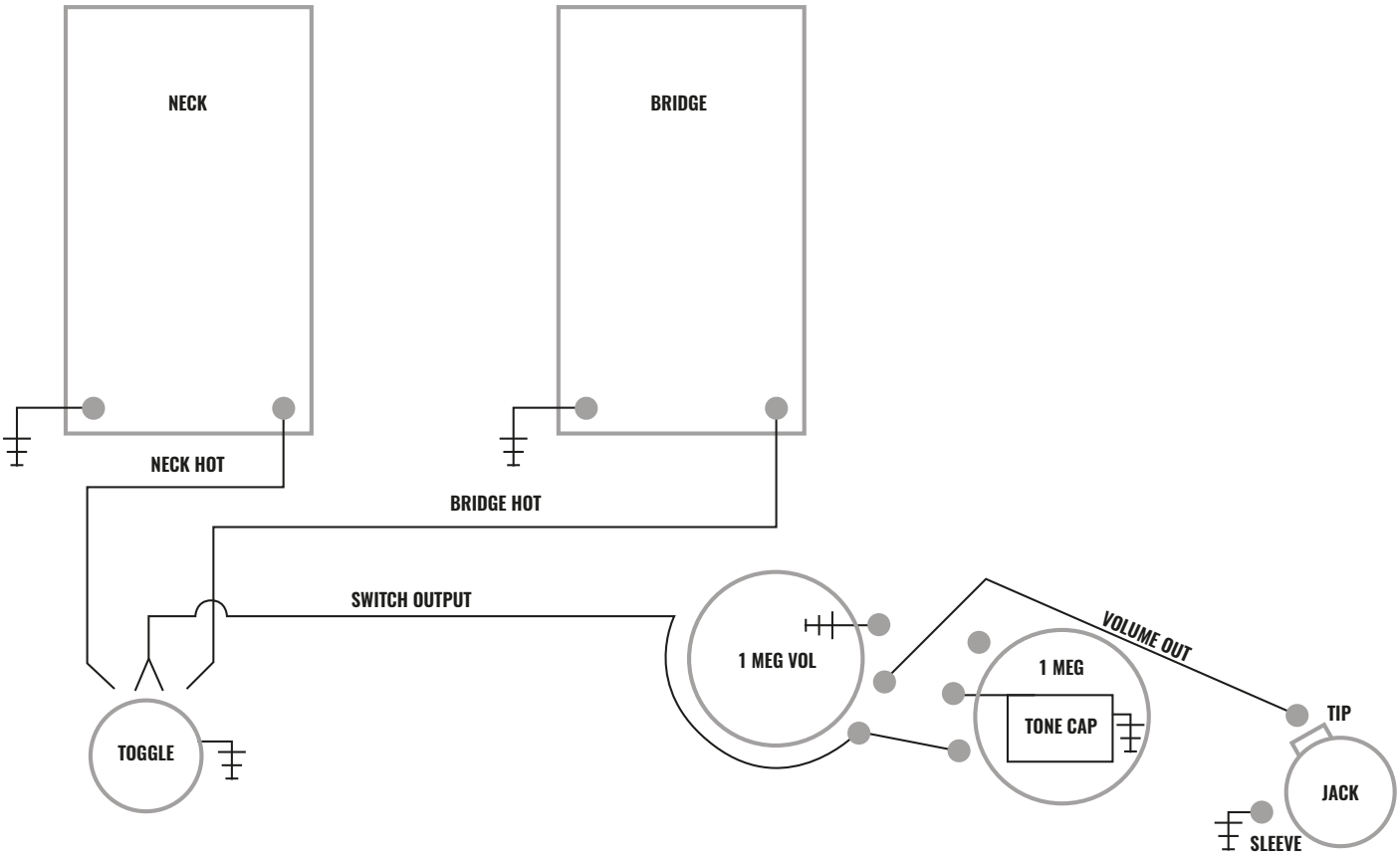
14 POTENTIOMETERS

For as long as offset guitars have existed, people have complained that the stock 1 Meg volume and tone controls are too bright and trebly, especially with certain amp rigs. Stepping down to 500K or 250K can drastically affect the overall tonality of the instrument: the lower the rating, the greater the difference. 250K pots are standard in most Fenders, which makes them a good choice here – you know exactly what you're in for if you've ever played a Telecaster. 500K is a great middle ground between them, rolling off some of the sting but retaining much of the bite of a good Jazzmaster pickup.

15 TREBLE BLEED

On the other end of the spectrum are those players whose style means that they rely upon consistent operation of the volume control – the

19
JAZZMASTER NO RC



SEYMOUR DUNCAN, CURTIS NOVAK, LOLLAR, THE CREAMERY, LINDY FRALIN, MCNELLY, KINMAN, HOUSE OF TONE AND MOJO ALL MAKE EXCELLENT PICKUPS FOR OFFSETS

ABOVE The wiring diagrams on this spread and the following pages offer a variety of ways to inject new sonic character into your offset

Jazzmaster and Jaguar circuits may cut off far too much treble when backed off. Treble-bleed networks are an easy mod to retain clarity and bite without altering your basic guitar tone.

Placed between the input and output lugs of your volume pot, this mod consists of a cap in parallel with a resistor. They can either be bought from a number of vendors or DIY-ed. One popular combination is a 470pF (marked as 471) capacitor and a 220K ohm resistor, but some swear by a 220pF capacitor instead.

16 NEW CONTROL PLATE

The Jaguar control layout will always be confusing, but luckily, there are alternatives. Take, for instance, the Fender Johnny Marr Jaguar and its four-way blade switch, which represents a more intuitive approach to the guitar's arsenal of sounds. To retrofit a blade into a stock Jaguar, you'll need a new control plate like that of the Marr, or the diagonal 'Wronski' plate, so-named for guitarist Dave Wronski of the surf band Slacktone. Players who prefer a toggle switch should opt for the 'Cobain' plate, as seen on Fender's recent Kurt Cobain Jaguar model.

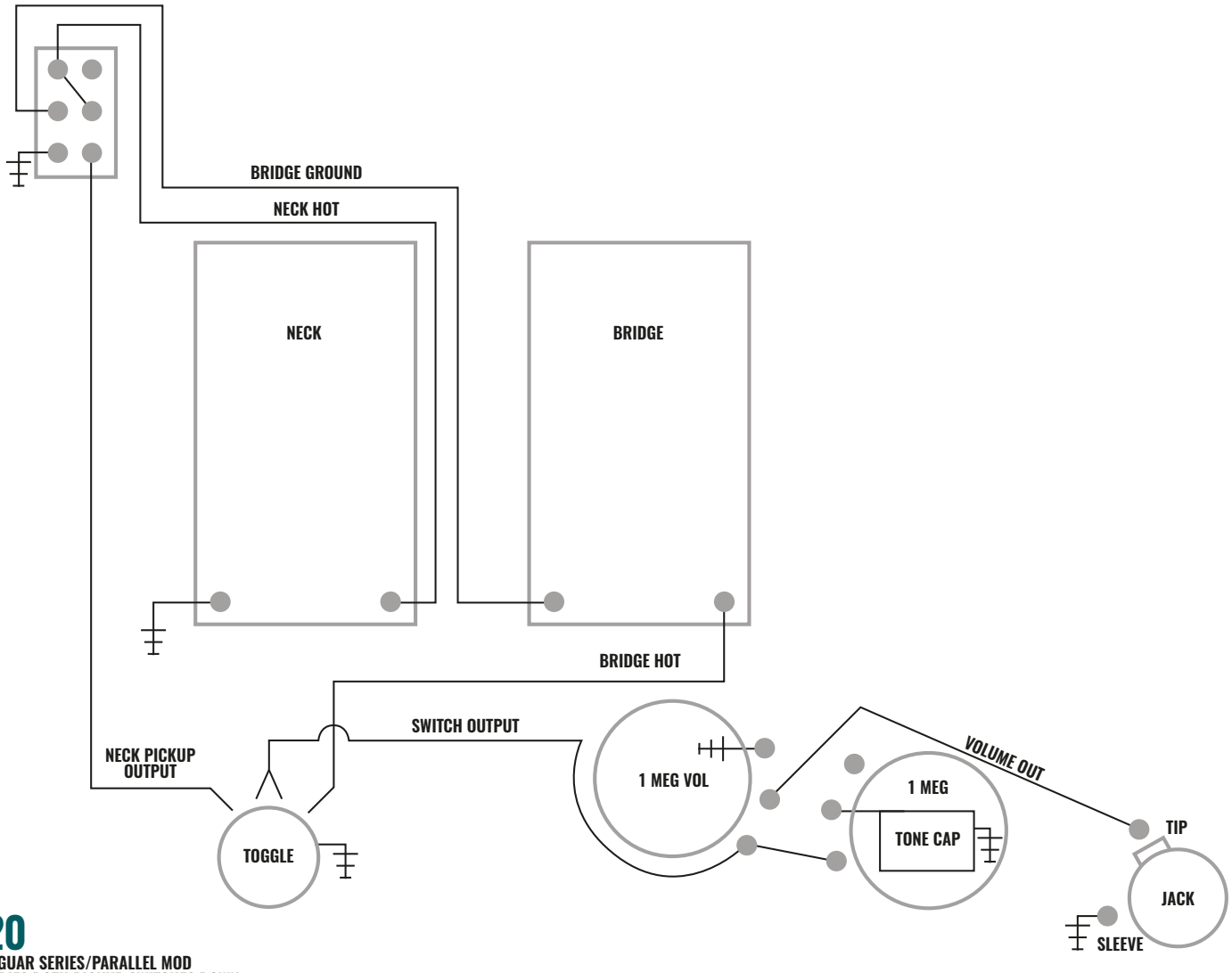
17 SPACERS

Another common complaint about those switches is that they're too easy to hit with even moderately energetic strumming. You could cram the end of a pencil eraser in there and break it off, but if you want to retain your tonal options while keeping the switches out of the way, spacers such as those sold by Faction Guitars are the perfect compromise. These spacers, priced at $4 each, fit between the switch casing and the pickguard or plate to which they're mounted, lowering the exposed tip of the switch enough so that it's tougher to hit accidentally.

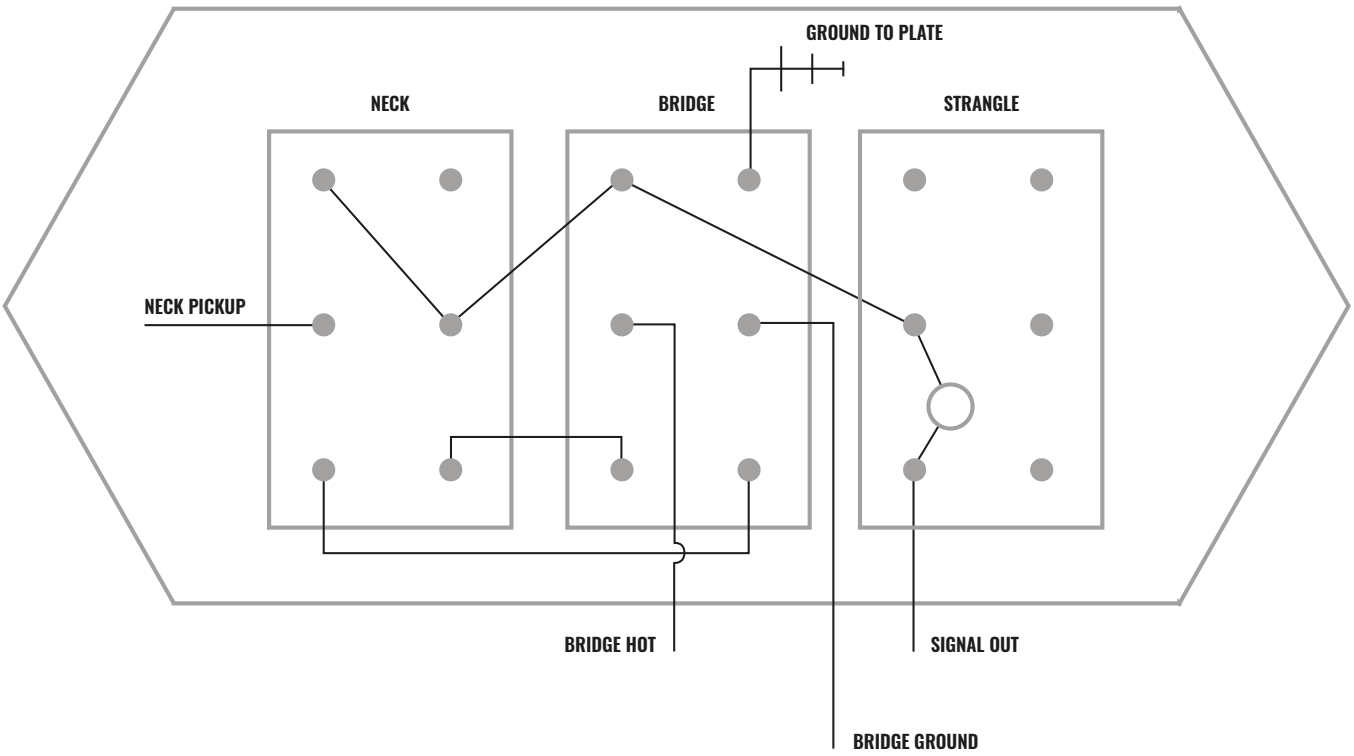
18 PICKUPS

The sheer number of pickup makers large and small out there in the guitar world means nearly every whim, within any budget, can be catered to. Seymour Duncan, Curtis Novak, Lollar, The

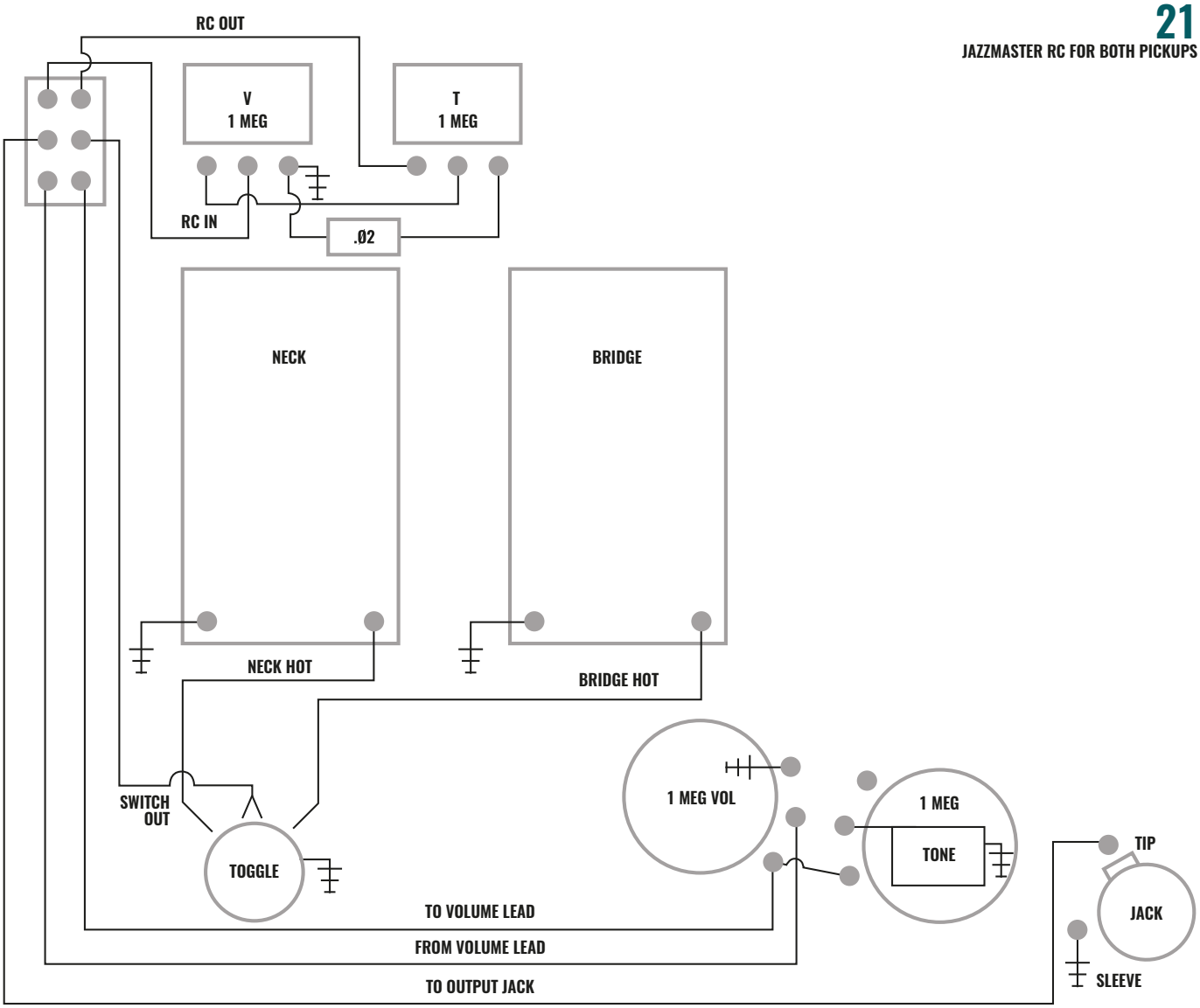
20
JAZZMASTER SERIES / PARALLEL



20
JAGUAR SERIES/PARALLEL MOD
SERIES BOTH PICKUP SWITCHES DOWN



21
JAZZMASTER RC FOR BOTH PICKUPS



Creamery, Lindy Fralin, McNelly, Kinman, House Of Tone and Mojo all make excellent drop-in replacements that cover a broad range of tones among them. P-90s, humbuckers, Wide Range, Gold Foils, sustainers… all are welcome here.

RHYTHM CIRCUIT MODS

In our recent piece praising Fender's rhythm circuit – which you'll find on *Guitar.com* – we made an impassioned plea for offset owners to employ those mysterious controls. Still, we're fully aware that even with condiderable experimentation, they won't work for everyone. Here are eight ways to make the most of your upper-bout electronics without dramatically changing the stock look.

NOTE These diagrams assume proper grounding for pots, switches, and the jack. Pay attention to which of your pickup leads are 'hot' and 'ground'.

19 CLIP IT!

Removing the rhythm from your circuit is fairly easy: simply re-route the neck pickup directly to the selector switch, the switch to the first lug of the volume pot and then the output from your volume pot to the output jack. If you remove the secondary tone circuit to save some weight, then you may even find your tone improved with the streamlined wiring.

20 SERIES/PARALLEL SWITCHING

Repurposing the rhythm circuit switch to run your pickups in either series or parallel is a painless procedure. You'll only be using the switch, so either disconnect or toss the roller pots. For Jaguars, here's a series mod that keeps the stock look. Note: You'll need to isolate the bridge pickup claw using a separate ground to the volume pot.

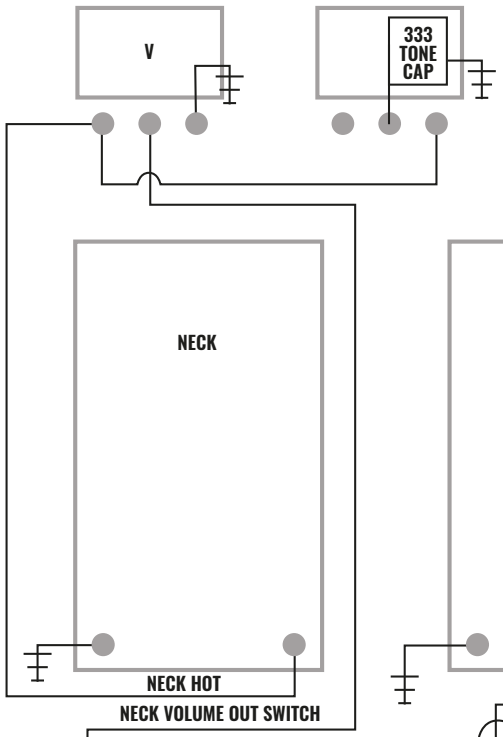
21 SWITCH IT UP

Instead of clipping the circuit, why not try to get more out of it instead? The rhythm circuit sounds great with the bridge pickup, so here's how to wire the guitar so that the toggle switch is still active. All pickup selections will now be available.

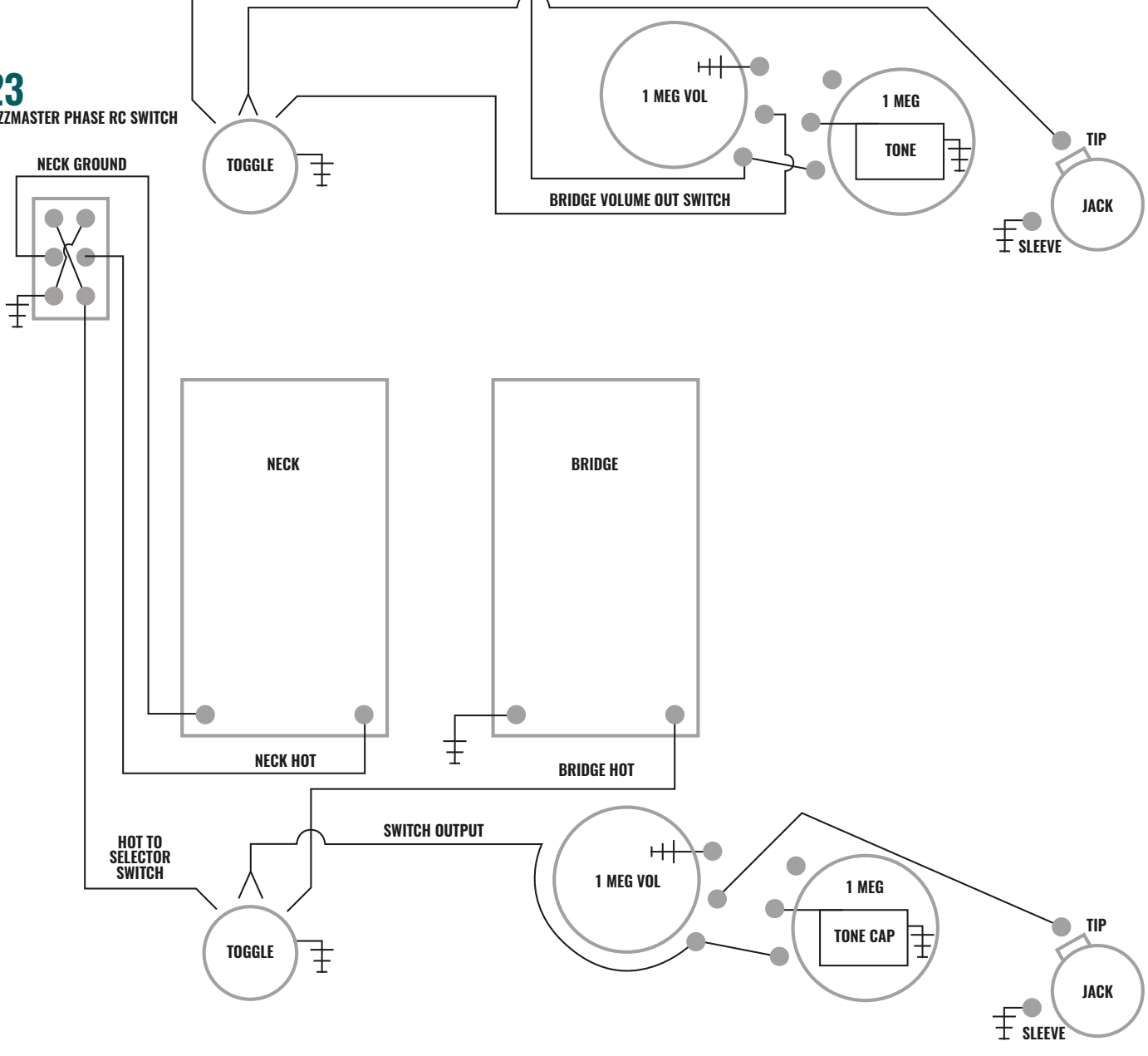
22 DEDICATED VOLUME AND TONE CONTROLS FOR THE NECK PICKUP

This Les Paul-like wiring scheme repurposes the rhythm circuit as a standard volume-and-tone combo

22
JAZZMASTER LP STYLE



23
JAZZMASTER PHASE RC SWITCH



BETWEEN THE BRIDGE AND VIBRATO LURKS AN OTHERWORLDLY PALETTE OF EERIE DISSONANCE, GHOSTLY REVERB AND PITCH-SPECIFIC RESONANCES

ABOVE The Jazzmaster's rhythm circuit is very much maligned and misunderstood. And as our wiring mods show, it's also ripe for reinvention

for the neck pickup and substitutes the 50K Tone for a 1 Meg mini pot.

23 PHASE SWITCHING

Players who swear by thin and funky tones will love this one. It represents a similar level of difficulty as series/parallel switching, though with equally usable results.

24 PASSIVE TREBLE AND BASS CONTROLS

One of the coolest tricks up the proverbial sleeve of Leo Fender's other company, G&L, is the wildly usable passive treble and bass control feature that the company incorporated into the S-500 and other models. Great for fattening up a thin sound or adding bite to a murky one, the Passive Treble and Bass (aka PTB) wiring has long been a secret of studio and stage alike.

We could draw up a diagram for this one, but honestly, it's just easier if we direct you to Rothstein Guitars (guitar-mod.com), purveyors of fine and customised wiring harnesses for all of your favourite guitars.

25 ONBOARD EFFECTS

It's also possible to install an onboard effect, such as a fuzz or delay, in the cavity for the rhythm circuit. There's enough room for a small breadboard and a nine-volt, but be forewarned: you'll need to be an electronics whiz to make this work. Start with something simple like a Fuzz Face or Tube Screamer and move up from there.

26 BEHIND THE BRIDGE PICKUP

Between the bridge and vibrato lurks an otherworldly palette of eerie dissonance, ghostly reverb and pitch-specific resonances. Amplifying them can lead to some interesting textures, and for that you'll need a pickup behind the bridge.

This one's not for the faint of heart, we're afraid. Most pickup types require some wood to be removed, and you'll also need to devise an appropriate wiring scheme to activate the pickup, either on an unused rhythm switch, mini-switch or a push/pull pot.

Whether or not Mr Fender could have anticipated the eventual widespread embrace of DIY enthusiasts for his then-top-of-the-line models is up for debate. No matter the historical perspective, one thing is clear: even those with limited experience should feel right at home adding personal touches to their prized instruments. Happy modding! ***G***

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